Chrysler "52"

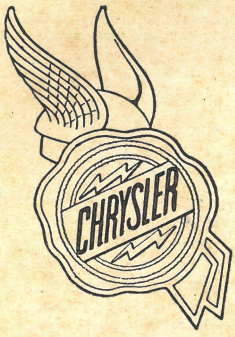
INSTRUCTION BOOK

Fourth Edition
February 1928

Chrysler Sales Corporation
Detroit, Michigan
U. S. A.

Chrysler "52"

INSTRUCTION BOOK



Fourth Edition
February 1928

Chrysler Sales Corporation
Detroit, Michigan

Price Twenty-five Cents

PRINTED IN U. S. A.

License Data

Chrysler "52"

Car Serial Number.....

Theft protection system, symbol plate built into instrument panel above instruments. Chassis shipped without bodies or cowl have symbol plate built into frame right side member vertical section just forward of the rear end of the hood.

Engine Serial Number..... (Stamped on top left side of cylinder block)

Cylinder Bore—3 5/8"

Stroke—4 1/8"

Number of Cylinders—4

S. A. E. Horse Power Rating—21.03

Piston Displacement—170.3 cu. in.

KEYS

Keys are serially numbered and number should be jotted down so that in case of loss new keys may be obtained. There is no number apparent on the lock cylinder for closed body door locks. Not more than two keys may be ordered and shipment will be made only to Chrysler dealers. These rules are required by the Board of Insurance Underwriters for the protection of Chrysler owners.

Table of Contents

Table of Contents (*Continued*)

General Description and Repair Operations

Table of Contents (*Continued*)

Index to Illustrations

A Personal Message to Chrysler Owners

IT IS our sincere desire that you obtain from your Chrysler "52" the service, comfort, enjoyment, and innumerable miles of low-cost travel that we have earnestly endeavored to build into it.

It is necessary only that you treat the vehicle with reasonable care and consideration in order that you and your family or friends may realize these qualities.

In the pages that follow we give much valuable information, without going into intricate detail, that you should have in order to give your car the careful attention which it merits.

For extensive repairs or adjustments, we request that you take your car to a Chrysler Service Station, where it will receive the particular attention of an organization devoted to your interests, with mechanics specially trained in the maintenance of Chrysler cars, using genuine Chrysler service materials.

Communications with reference to Chrysler cars should give serial number and mileage.

CHRYSLER SALES CORPORATION

Inspection and Care

Regular inspection, with adjustment or tightening when needed, goes far toward keeping low the maintenance expense and upholding the high standards of quietness, reliability and performance built into the vehicle at the factory.

Engine

The "new car instructions" posted on the windshield should be followed closely. A new car should not be driven faster than 30 miles per hour for the first 100 miles nor faster than 35 miles per hour for the next 400 miles. After 500 miles the maximum speed should not be increased more than 5 miles per hour for each additional 100 miles of driving.

The above speeds are permissible for high or third speed operation only. While driving in intermediate, the maximum speed should be half of that for high gear.

When negotiating hills or heavy roads requiring more than half throttle opening to attain the above specified speeds, the gears should be shifted to a lower speed, the throttle opening and the car speed reduced.

Oiling System

All outside oil line connections and gaskets should be inspected carefully and tightened if necessary. Lubricant is to be maintained at the high level point in the crankcase, transmission case, and rear axle housing. (See Lubrication Instructions, Page 12.)

Ignition System

It is a good plan to check over the wiring to see that all connections are tight, that insulation is in good condition, that no wires are chafing or rubbing against metal parts which will wear off insulation and cause a short circuit. Dirt and dust should be wiped off the inside and outside of the distributor cap occasionally. While the distributor cap is off, the rotor contact should be cleaned. Cleaning and adjusting the spark plugs at intervals of about every two months will also aid in keeping the ignition system in good condition. (Page 35.)

When the engine is being used as a brake while coasting, the ignition switch should NOT be turned off. Failure to observe this precaution may cause excessive loading and shocking of the driving mechanism, muffler and exhaust valve damage, fouling of the combustion chambers and spark plugs, excessive reduction of the inlet manifold temperature, and dilution of the engine lubricating oil.

When the engine is not running, the ignition switch should be turned off to prevent discharging the battery and damage to the ignition coil.

Storage Battery

Water should be maintained at the proper level in the storage battery. (Page 39.) If the nature of service is such that an excessive quantity of water is required by the battery, the generator charging rate should be reduced.

Cooling System

The hose connections should be inspected occasionally for leaks and the leaks, if any, stopped by tightening the hose clamp screws. The radiator stud nuts and core to shell screws should also be kept tight. (Page 25.)

Fuel System

Cleaning the strainer in the carburetor about once every five or six months is an added precaution against the flow of fuel becoming obstructed. Carburetor adjustments other than this should not be attempted by any but experienced carburetor mechanics. (Pages 28 and 30.)

Clutch

Abuse of the clutch should be avoided. Starting the car in second gear is permissible only for a gentle start on a hard, level road or down grade. The clutch pedal should have from 1¾" to 2" of free movement before resistance can be felt. Less than 1" free movement of the pedal will cause damage to the clutch. (Page 43, "Adjustments".)

Pressure on the clutch pedal causes a certain amount of wear on the "throwout" mechanism and rapid wear of clutch disc due to slippage. (Page 45.) A driver should never rest his foot on the pedal except during the operation of shifting gears or stopping the car.

Transmission

The gears must be fully engaged after shifting to different speeds before relieving pressure on the clutch pedal. Lubricant should be maintained at the proper level in the transmission case. (Page 18.) This may be inspected by removing the plug from the filler hole in the side of the transmission. This inspection is necessary only about every six months.

Brakes—Two-Wheel

The brake bands, at the wheels, should be adjusted so as to just clear the drums at all points. (Page 58.) The brake anchors should be inspected occasionally to see that the anchor clips on the bands move freely when the brakes are applied.

Brakes—Hydraulic Four-Wheel

The level of the liquid for the hydraulic brakes should never be below the half full point of the supply tank on the dash. The pump plunger in this tank should always be turned down to a tight seat.

The brake bands, at the wheels, should be adjusted so as to just clear the drums at all points. (Page 63.) During the summer, especially in very hot climates, the brake pedal, after the car has stood overnight, should have ¾" of free travel before any resistance is felt. This free travel is gradually taken up as the temperature rises. (Page 65.)

Steering Connections

The steering gear connections and front axle tie rod should be inspected frequently, as well as the front wheel alignment. (Pages 53 and 54.)

Springs

The nuts on the clips, holding the springs to the axles, should be kept very tight at all times. They should be inspected at least three times during the first month and about once every month for the succeeding six months. (Page 55.)

Tires

Water and road dirt will work into cuts in tires and loosen the rubber from the carcass unless the cuts are properly and promptly sealed. It is also important that the air pressure in the tires be properly maintained at all times. This should be checked about once each week. (Page 54.)

Wheels

The front wheel bearings require an occasional inspection for lubricant and adjustment. (Page 54.) The nuts holding the tire rims in place are apt to loosen slightly and should be tightened when necessary, as well as the nuts holding the rear hubs to the axle shafts.

Front Axle

All parts must be well lubricated and the front wheels jacked up and the bearing adjustment checked. (Pages 53 and 54.)

Rear Axle

The lubricant in the rear axle should be at the proper level and of high quality. (Page 18.)

Body Door Hinges and Locks

These require practically no attention. At times a tendency to bind may develop, but a few drops of oil applied to the movable parts will keep this equipment in good condition.

Washing the Car

It is possible in many instances to clean the Duco finish of the body and hood by wiping with a dry cloth, but it is usually best to wash the finish with water and a sponge. At times the finish may appear to be turning gray or white, which only indicates that cleaning and polishing are required. If alcohol is spilled on the finish it should be wiped off immediately to avoid spotting.

Varnish should not be used for touching up scratches in the Duco finish. Duco only should be used for such purposes.

The undersides of the fenders and the running gear should be flooded with water and, after most of the mud is soaked off, a warm soapsuds will take off the remainder. Then they should be thoroughly rinsed with running water. The same sponge should not be used on the body and running gear. After washing, the car should be thoroughly dried with a soft chamois skin.

After the car is clean, it should be polished with Duco Polish No. 7, or a comparable product.

The finish should then be protected by an application of Simoniz Wax, Johnson's Liquid Wax or Duco Wax. This is an important factor in the life of the finish.

Precautions for Summer

The cooling system should be thoroughly flushed and all water leaks stopped (new hose installed, if necessary). Fresh lubricant should be used in the transmission and rear axle after the interior of these cases has been thoroughly cleaned by flushing with kerosene, and oil leaks stopped. The carburetor choke should be adjusted, if necessary, for full opening. The battery terminals should be cleaned and coated with vaseline, and water replenished in each cell when necessary. It is possible that the generator charging rate will need to be reduced to prevent excessive evaporation of the battery water. The car should have a general inspection and lubrication throughout, including the grinding of valves and relining of brakes, if necessary. The engine oil should be changed every 1000 miles during normal operation in warm weather, but when the car is driven extremely fast or worked hard on heavy pulling in hot weather the oil should be changed every 500 miles.

Precautions for Winter

A non-freezing solution should be used in the cooling system after the first indication of cold weather. (Page 27.) If an alcohol solution is used, the specific gravity should be checked about once a week to make sure of it being the desired strength because alcohol evaporates rapidly and raises the freezing point of the solution. The lower half of the radiator should be covered.

The carburetor should be drained to remove any water which may have collected there.

The engine oil pan should be removed and thoroughly cleaned, as well as the oil strainer, the parts then reinstalled and the pan filled with fresh oil. When refilling at temperatures approaching zero, an oil of light body having a zero or below zero cold or pour test as recommended by reputable oil companies' lubrication charts should be used. The engine oil should be changed every 500 miles during normal operation in cold weather, but if the car stands in the cold and is used principally for short runs the oil should be changed every 250 miles.

The lubricant in the transmission and rear axle should be drained and then filled to the proper level with fresh lubricant. (Pages 17 and 18.)

Tire chains should be adjusted loose enough to allow them to creep around the tires.

Storage of Tires

If the car is not to be used for several months it should be jacked up until the tires clear the floor. The tires should be inflated only sufficiently to hold their normal shape. If convenient it is well for the tires to be removed from the rims and placed in a room with subdued light and a temperature of about 60 degrees Fahrenheit. Tires in storage or not being used frequently should be protected from strong sunlight.

Storing the Car

The car should be thoroughly washed and dried. The wheels should be jacked up sufficiently for the tires to clear the floor. Unpainted metal parts should be coated with heavy oil to prevent rust and corrosion. The

storage place should be dry and have as even a temperature as possible. Sudden changes of temperature and close proximity of steam pipes or other heating apparatus should be avoided. A subdued light evenly distributed will best preserve the finish. A car should never be stored in the same building with horses or other animals. The water should be drained from the radiator. The spark plugs should be removed and cleaned and a small quantity of engine oil poured into each cylinder through the spark plug holes. Then the spark plugs should be reinstalled and the engine cranked several times by hand. This operation should be repeated every sixty days while the car is in storage.

Partly disengaging the clutch and blocking the pedal in this position will prevent corrosion developing on the faces of the clutch plates. The hand brake should be released and the storage battery stored at a battery service station for proper attention during the storage period. (Page 39.)

Lubrication

Proper lubrication is of vital importance. Lubricating with the best materials and with the utmost care will be repaid many times by long wear and good service.

The use of re-refined oil should be avoided. The process of re-refining engine oil requires considerable care and even the best re-refined oil is not suitable for use in any Chrysler engine. This is a matter of vital importance and considerable care should be taken when selecting engine oil to make certain that it is of the highest quality.

Engine Lubrication

Oil is put into the engine through the oil filler located on the left hand side of the crankcase. The oil level gauge is beside the filler. When a reading of this gauge is being taken, the engine should be stopped, the indicator removed and the oil wiped off the indicator rod. The indicator should then be inserted again and removed for a true reading. The engine should never be operated when the oil is below the half full point of the indicator rod.

For correct engine lubrication a high-grade, well-refined oil is essential. As a guide to the proper viscosity or body of oil for summer and winter conditions, which vary for different territories, the lubrication charts of the reputable oil companies should be consulted. In general an oil having the body of S. A. E. viscosity number 30 is recommended for summer use and for winter use except where zero or below zero temperatures are encountered. For the latter condition an oil with a low cold test and with a body of S. A. E. viscosity number 20 or 30 is recommended.

The engine lubrication system is full force feed to the main and connecting rod bearings. The bottom of the crankcase acts as an oil reservoir. The oil passes through a strainer before it is drawn into the pump which is on the right hand side of the crankcase and driven by a spiral gear integral with the camshaft. The oil distributor is bolted to the center main bearing cap.

The oil is conducted to the center main bearing by a passage in the distributor and into the front and rear main bearings by tubes. From these bearings, the oil is forced through passages in the crankshaft to the connecting rod bearings.

The camshaft bearings, cylinder walls, valve guides, stems, and all reciprocating parts are generously lubricated by the oil spray off the bearings and the streams from the connecting rod oil passages. The stream of oil from the front main bearing into the timing gear case forms an oil bath for the gears.

Oil Pressures

The oil pressure gauge, on the dash, at normal driving speeds, with warm engine and oil, will show approximately 35 to 40 lbs. pressure. Greater pressure compresses a spring in the oil pressure relief valve, allowing excess oil to pass back into the engine oil reservoir.

The oil gauge should be watched at all times, particularly in winter. If at any time it should indicate no pressure, the engine should be stopped immediately. If there is plenty of oil in the pan, the oiling system should be carefully checked by a competent mechanic before starting.

The oil pressure relief valve may be adjusted to increase or decrease pressure on the gauge, but it should not be touched until the oiling system has been carefully checked by an experienced mechanic. If the gauge shows inadequate or too great pressure, it indicates trouble in the oiling system. Changing the position of relief valve to correct gauge reading removes effect of the trouble, but does not remove the cause. If it becomes necessary to adjust the oil pressure relief valve, the oil pan drain plug and strainer assembly in the oil pan should be removed and the locking wire withdrawn from the spring plug. The slotted plug should be turned clockwise to increase the pressure or anti-clockwise to decrease the pressure.

There are several conditions which may cause a reduction in the pressure registered on the gauge. They should always be carefully checked before any change is made in the adjustment of the pressure relief valve. Some of them are as follows:

Use of an oil with too heavy a body or with too high a cold or pour test at zero temperature or below.

Oil excessively thinned by unburned fuel.

Loose bearings. The looseness may be due to wear and should be investigated.

A leaky or broken oil tube.

Clogged oil screen.

Broken oil gauge.

Draining Crankcase Oil

Due to natural conditions, the engine oil, in use, is constantly being impregnated with fuel, water, and acid, depreciating the value of the oil as a lubricant. For this reason the oil should be replaced at regular intervals. (See lubrication charts inside back cover.) Running the engine

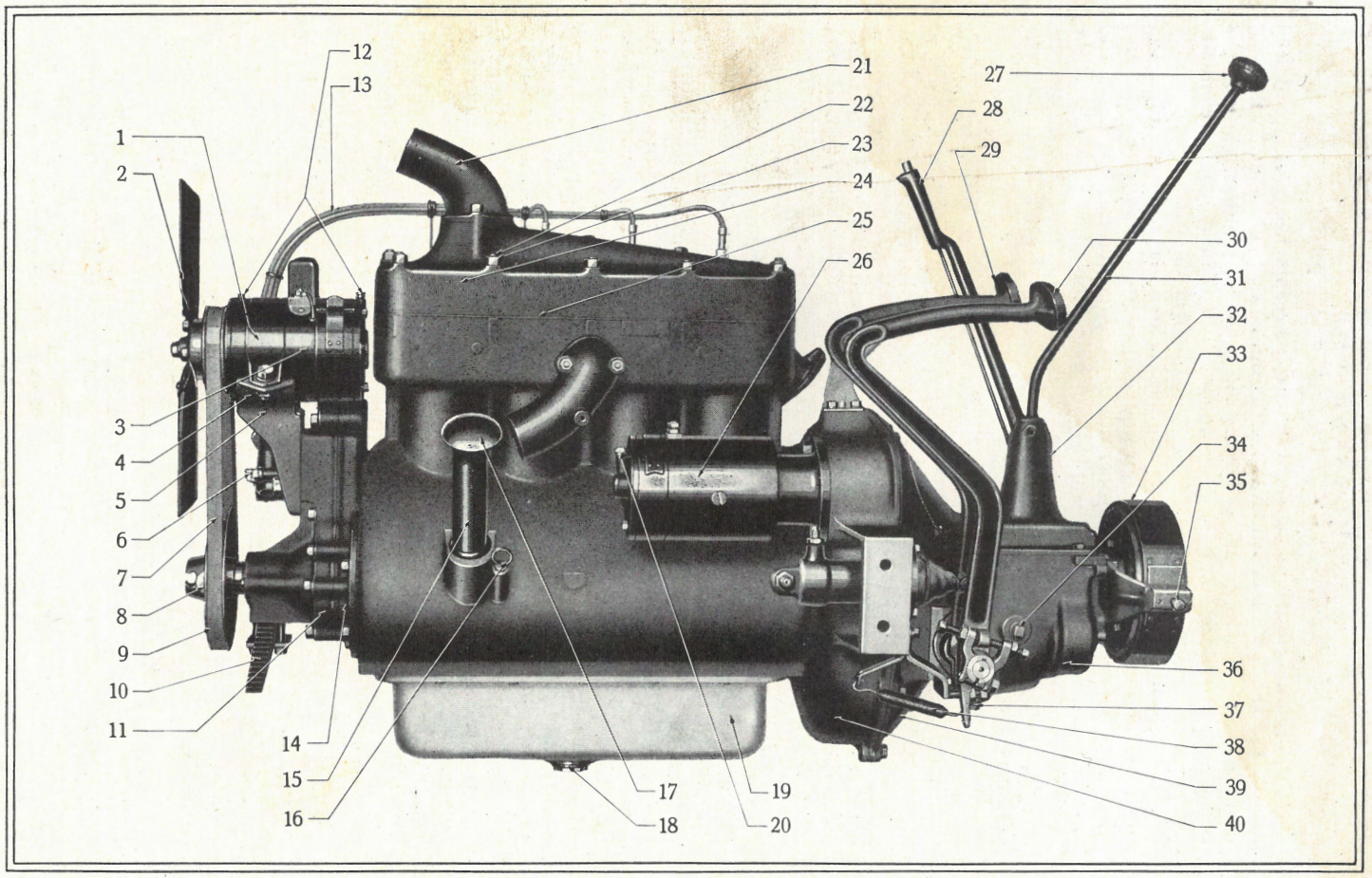


Fig. 1—Left Side View of Power Plant (with Hydraulic Brake Equipment)

with the choke closed or partially closed increases the amount of fuel drawn into the cylinders. To reduce the amount of fuel which will work into the engine oil, the engine should be run with choke button pushed in as far as possible. The rapidity of accumulation of these damaging elements can be governed to a great extent by the driver of the car.

Fuel accumulates in the engine oil because of a certain excess of fuel in the combustion chambers not burning and working down the cylinder walls into the crankcase. Only certain percentages of vaporized fuel and air when mixed will ignite and explode in the combustion chamber. If the mixture contains too much fuel the excess will not burn, but a certain amount of it will remain on the cylinder walls and work down into the crankcase by the action of the pistons.

Water vapor is a product of combustion. There is approximately as much water vapor formed by weight as fuel consumed. This accounts for the white vapors and water coming from the exhaust which is most noticeable in cold weather. A certain amount of this vapor condenses on the cylinder walls and is carried into the crankcase by action of the pistons. This water accumulates in the crankcase and under certain conditions forms an oil sludge. An excess of sludge or water may interfere with lubrication.

Acid forms in the combustion chamber also due to natural causes. Fuel contains varying percentages of sulphur and, when burned, changes to sulphur dioxide. The sulphur dioxide unites with water in the combustion chamber, making sulphurous acid.

The accumulation of these non-lubricating elements in the engine oil has very damaging effects on the wearing surfaces. Fuel thins the oil, reducing its lubricating ability. Water is a non-lubricant and is liable to freeze, causing stoppage of the oil circulation. Sulphurous acid attacks bearing surfaces and causes excessive wear. The rapidity of accumulation of the above elements increases as the temperature decreases. These elements can only be removed by draining the oil from the crankcase and the following instructions should be observed carefully:

To drain the oil, the drain plug in the bottom of the oil pan should be removed. The best time to drain is after a run when the engine is heated. The oil is thinner when it is hot and is also thoroughly mixed. It will, therefore, carry off sediment more completely.

Fig. 1—Left Side View of Power Plant (with Hydraulic Brake Equipment)

1—Generator cradle strap
2—Fan
3—Generator
4—Generator cradle stud nut
5—Generator cradle
6—Oil cup
7—Fan belt
8—Crankshaft starting jaw
9—Fan and generator drive pulley
10—Engine front support
11—Gear case cover
12—Oil cups
13—Ignition cables
14—Front bearing and gear case
15—Oil filler tube
16—Oil level indicator
17—Oil filler cap
18—Oil pan drain plug
19—Oil pan
20—Oil cup
21—Water outlet elbow
22—Cylinder head stud
23—Cylinder head stud nut
24—Cylinder head
25—Cylinder head gasket
26—Starting motor
27—Gear shift lever knob
28—Emergency brake lever
29—Brake pedal
30—Clutch pedal
31—Gear shifter lever
32—Gear shifter housing
33—Emergency brake band
34—Transmission case oil level plug
35—Brake anchor screw
36—Transmission case
37—Transmission drain plug
38—Clutch pedal pull-back spring
39—Clutch housing
40—Flywheel housing

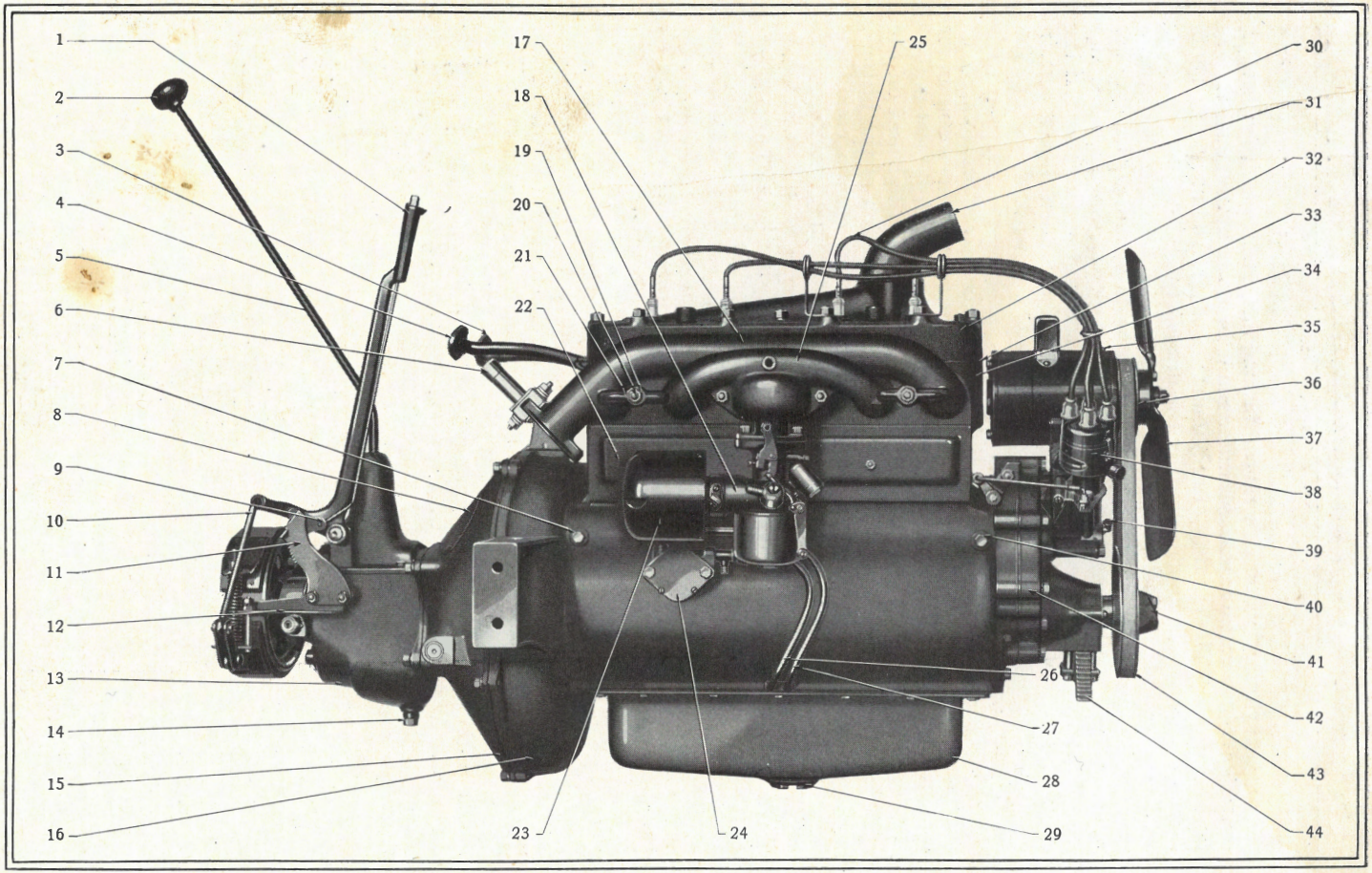


Fig. 2—Right Side View of Power Plant

Kerosene should never be used for flushing out the oil pan and lubricating system. A certain amount will remain in the system, collecting in pockets from which it cannot readily be drained and will dilute the oil.

Cleaning Oil Pan and Screen

At least once a year, preferably in the fall, the oil pan should be removed from the engine and thoroughly washed. The oil strainer should be removed and washed at this time.

Distributor

The grease cup on the distributor housing should be kept full of a high-grade medium cup grease and should be given one turn about once each month. The oil cup on the base of the distributor should be filled with engine oil every 2000 miles.

Care should be taken to keep grease off breaker points and governor weights.

Generator

The oilers at the ends of the generator body should be filled with light engine oil every 2000 miles. Oil should never be used on the commutator.

Starting Motor

The oiler for the commutator end bearing should receive a few drops of light engine oil every 5000 miles. Care must be exercised when oiling the starting motor to not allow any oil to get on the commutator.

Lubricant Gun

The lubrication system for the chassis consists of an easily operated high-pressure gun and a set of nipples. The gun is filled by unscrewing the end cover and filling the barrel with lubricant as specified for various points.

One pumping action is generally sufficient, but two or more pumping actions should be given if necessary. The return motion of the plunger automatically fills the inner chamber of the gun with a fresh charge of lubricant.

Fig. 2—Right Side View of Power Plant

1—Emergency brake lever
2—Gear shifter knob
3—Clutch pedal
4—Brake pedal
5—Gear shift lever
6—Starter switch
7—Camshaft bearing lock screw
8—Clutch inspection hole cover
9—Brake lever pawl
10—Brake operating rod
11—Brake lever sector
12—Brake band adjusting bolt bracket
13—Transmission case
14—Transmission drain plug
15—Clutch housing
16—Flywheel housing
17—Exhaust manifold
18—Carburetor
19—Manifold clamp stud nut
20—Manifold clamp stud
21—Manifold clamp
22—Valve cover
23—Air cleaner
24—Oil pump assembly
25—Intake manifold
26—Oil pressure tube
27—Oil suction tube
28—Oil pan
29—Oil pan drain plug
30—Spark plug cable
31—Water outlet elbow
32—Cylinder head
33—Cylinder head gasket
34—Cylinder block
35—Generator oiler
36—Generator and fan pulley
37—Fan
38—Distributor
39—Oiler
40—Camshaft bearing lock screw
41—Crankshaft starting jaw
42—Gear case cover
43—Generator and fan drive pulley
44—Engine front support

Clutch

The clutch is of the single dry plate type, requiring no lubrication, except the release bearing which should be filled with a high-grade fluid gear lubricant every 5000 miles. (Page 43.)

Transmission

The transmission case should be kept full to the level of the filler plug, on the left side, with a high-grade fluid gear lubricant. Fresh lubricant should be used each spring and fall after flushing the inside of the housing with kerosene. In winter, in very cold climates, where the atmospheric temperature is below 0° Fahrenheit, this should be thinned with one-quarter pint of colorless kerosene.

Rear Axle

The rear axle housing should be filled to the level of the filler plug in the cover with a high-grade fluid gear lubricant. In winter, in very cold climates, where the atmospheric temperature is below 0° Fahrenheit, this should be thinned with one-half pint of colorless kerosene.

Note: Grease or non-fluid oil should never be used in the transmission case or rear axle housing.

Front Axle

The front axle king pins should be lubricated by means of the high-pressure lubricant gun through the nipples provided in the upper and lower forks of the axle yokes. A high-grade fluid gear lubricant should be used at intervals of every 500 miles.

The ball and socket joints on the ends of the tie rod as well as the drag link should be lubricated at intervals of every 500 miles.

The front wheel bearings should be packed with a medium cup grease, that will not harden at low temperatures, at intervals of every 5000 miles. Before new lubricant is packed into the bearings it is advisable to clean the bearings and the inside of the hubs with kerosene.

Springs

The bolts through the front and rear ends of the chassis springs, as well as the bolts through the rear shackles of the front and rear springs, are provided with lubricant gun nipples. A high-grade fluid gear lubricant of heavy body should be forced through the nipples at these points at intervals of every 500 miles.

Lubricant should never be used between the leaves of these springs. If it is ever necessary to remove rust from between the leaves, a light penetrating oil (containing no graphite) may be used because it will evaporate readily and leave the surfaces of the leaves clean and free from substances which are liable to cause improper spring action and improper steering action at high speed.

Brakes—Two-Wheel

The anchors on the brake bands should be oiled every 2000 miles and their action checked to see that they work freely. All brake rod connection joints should be oiled according to the lubrication diagram on the

inside back cover of this book. The transmission emergency brake rod connections should be oiled every 2000 miles with a few drops of engine oil.

Brakes—Hydraulic Four-Wheel

The anchors on the brake bands should be oiled every 2000 miles and their action checked to see that they work freely. There are no other points in the hydraulic brake operating mechanism requiring lubrication. The transmission emergency brake rod connections should be oiled every 2000 miles with a few drops of engine oil.

Steering Gear

Frequent lubrication of the entire steering mechanism provides easy steering. The steering gear housing should be filled every 5000 miles with a special heavy steering gear lubricant. This lubricant should be diluted with engine oil, in extremely low temperatures, if necessary.

General Description and Repair Operations

Engine

The power plant of the Chrysler "52" is of the unit type, having a four-cylinder engine, of the L-head, four-cycle, poppet valve construction. The cylinder head and oil pan are removable.

Lubrication is accomplished by a full force feed system to all crankshaft and connecting rod bearings and the center camshaft bearing. The connecting rods have metering apertures drilled in their lower ends to spray the cylinder walls, piston pins, end camshaft bearings, and the entire valve operating mechanism.

The front support for the engine consists of a 14-plate semi-elliptic spring bolted to the under side of the timing gear housing. The ends of the bottom plate of the spring rest on the frame cross member, providing a cushion for the front end of the engine. This absorbs the torque impulses of the engine and very effectively prevents vibratory sounds developing and being distributed throughout the chassis and body.

The camshaft is driven by the crankshaft through gears on each shaft. The ignition distributor, which has single breaker points and semi-automatic spark advance, is accessibly mounted on the front of the timing gear cover and driven by the camshaft.

Pistons and Rings

The pistons are light weight, of Chrysler special slotted skirt design. The rings are all above the piston pin, which floats free in the piston, clamped in the connecting rod. A plain compression ring is assembled in the upper groove of the piston. An oil wiper ring is assembled, with undercut down, in the middle groove of each piston. A special oil ring is used in the bottom groove.

Pistons are fitted with .001″ to .0015″ clearance at bottom of skirt, and .003″ to .0035″ clearance at top of skirt, .022″ clearance at the head. Piston pins are fitted with .0005″ to .001″ clearance, which is a finger push fit or even loose enough to permit the pin to fall through the hole when

the piston is shaken by hand, but not jarred. This exact fit is proper for lubrication and to prevent unnecessary thrust of the piston against the cylinder wall.

Piston rings have a gap measure of .005″ to .015″. When assembling new parts the exact clearance must be allowed and the rings should move freely in the grooves when the piston is shaken. Piston and connecting rod assemblies should be removed from the top of the engine.

When connecting rod assemblies are being reassembled to an engine, the oil passages, through the big end bearing, should face toward the valve side of the engine.

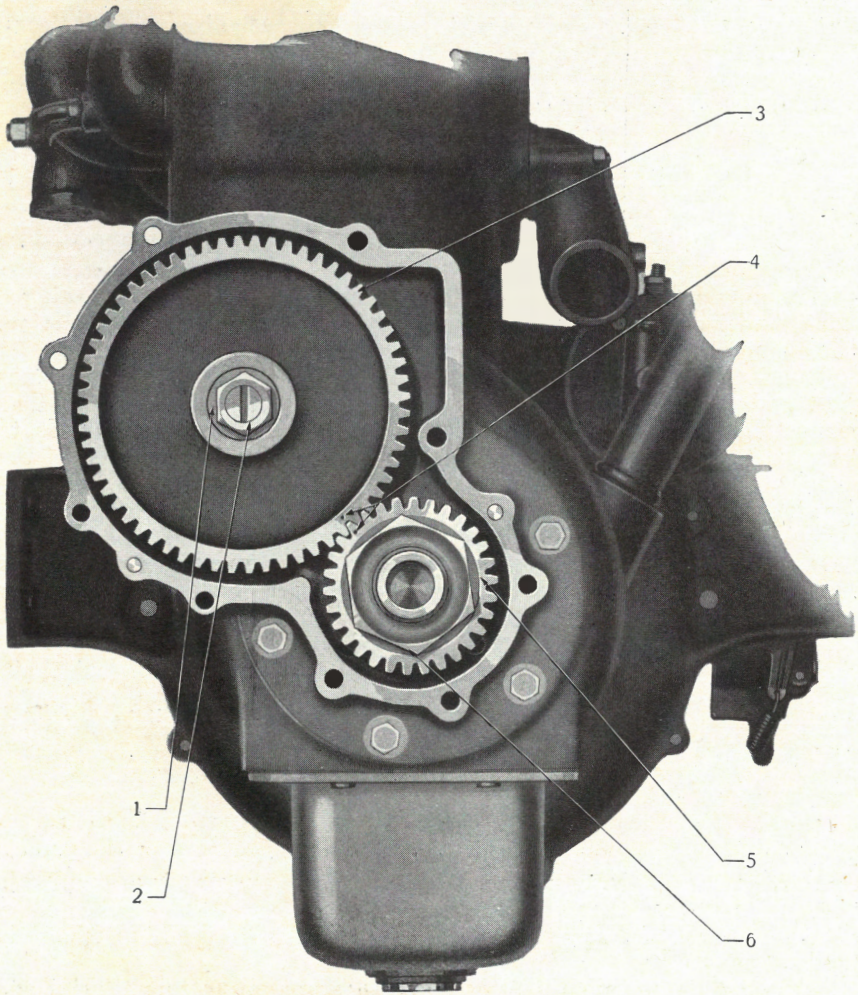


Fig. 3—Timing Gears

1—Camshaft gear collar
2—Camshaft gear nut
3—Camshaft gear
4—Timing marks
5—Crankshaft gear
6—Crankshaft gear nut

Chrysler "52" pistons and rings were selected only after exhaustive tests proved them most efficient for this engine. Under no consideration should so-called trouble-proof pistons and rings be installed. Chrysler pistons and rings are the results of very elaborate, painstaking and expensive research and under no circumstances should any of these parts be used unless obtained directly through authorized Chrysler Service Stations, as having come from the Chrysler Sales Corporation, because trouble will otherwise inevitably result. If for any reason it should ever be necessary to replace one or more pistons, care should be exercised when selecting them so that the variation in weight is not more than 1/8 of an ounce in the entire set of four pistons. If this limit is not followed, excessive vibration may result. Chrysler owners should always insist upon the use of genuine parts.

Bearings

The crankshaft is positively balanced dynamically and statically, and mounted in three bronze-backed, babbitt-lined bearings. The crankshaft main bearings are not interchangeable nor adjustable and are line-reamed after assembly into the crankcase. The camshaft, driven by the crankshaft through gears, is mounted in three large bearings: the front and rear are babbitt bearings, the center is machined in the crankcase. The connecting rods are manufactured to exact size and are interchangeable without fitting, having bearings of babbitt, cast integral by a centrifugal process, thereby providing a perfect bond and a bearing free from flaw or foreign substance.

Due to the design of the oiling system, all engine bearings are assembled with a clearance of .002″ to .0025″, so that there is always a film of oil as a cushion between the bearings and shaft.

A connecting rod bearing cap should never be filed for adjustment of the bearing.

Valves and Valve Timing

Extra large valves are mounted along the right side of the cylinder block and are lifted by adjustable tappets of mushroom type. The inlet valves are of Wilcrome heads and steel stems. The exhaust valves are of silchrome steel. Valve stems operate in cast iron guides, generously lubricated. The valve tappets are mounted in the cylinder block above the camshaft.

To Set Valve Timing

The crankshaft should be turned until Nos. 1 and 4 pistons are at top dead center. When these pistons are at top dead center the timing marks on the crankshaft and camshaft gears should be opposite each other as shown in Fig. 3.

To Check Valve Timing

The valve tappets should be adjusted while the engine is cold with .008″ clearance for the intake and exhaust. This clearance is necessary when checking the valve timing, but should be changed to .006″ for the exhaust and .004″ for the intake when the engine is warm and as soon as the check-

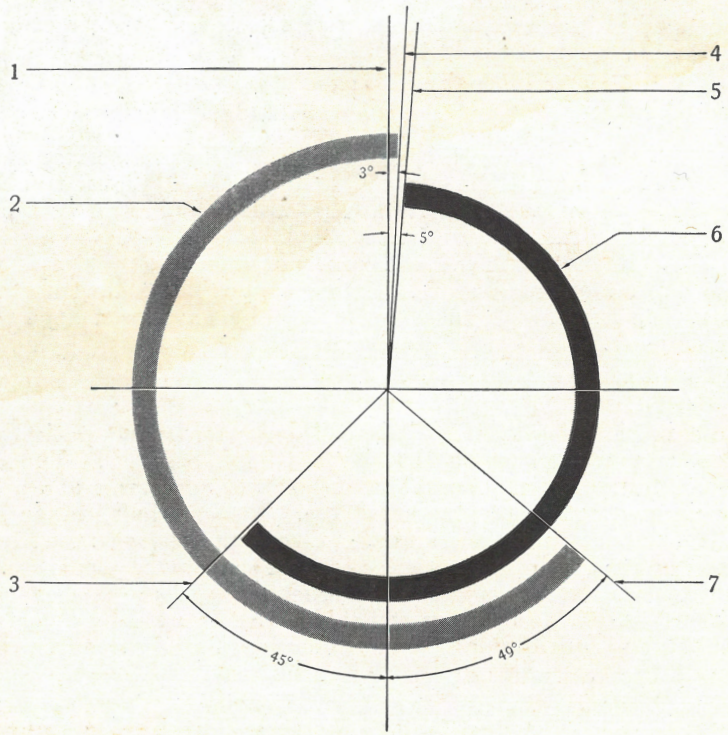


Fig. 4—Valve Timing Diagram

1—Top dead center
2—Duration of exhaust opening 232°
3—Intake closes
4—Exhaust closes
5—Intake opens
6—Duration of intake opening 220°
7—Exhaust opens

ing is completed because the latter is the proper setting for quiet valve operation.

The crankshaft should be rotated until No. 4 piston is coming up on the compression stroke and stopped when the piston is .004″ past top dead center. The No. 1 exhaust valve tappet should be down just enough to be free and the valve just closed.

No. 1 cylinder inlet valve opens two degrees of crankshaft rotation later or with the piston .010″ past top dead center. The valve timing diagram should be consulted.

The exhaust valves are Nos. 1-4-5-8.

Valve Grinding

The water should be drained from the cooling system and the upper hose removed from the radiator. The fourteen (14) cylinder head stud nuts should next be removed, as well as the spark plugs and wires.

If the cylinder head should stick, a sharp instrument should not be placed between it and the cylinder block as this will cause damage to the gasket and render impossible a tight joint after assembly. If necessary to use force to dislodge the cylinder head, it should be tapped lightly on the

sides of the casting, using a wooden mallet or soft metal hammer. Eye bolts screwed into the spark plug holes provide the best method of loosening and lifting the cylinder head. The valve spring cover plate should next be removed. The valve springs should be compressed and the retainers and locks removed.

The design and chemical specifications of the Chrysler "52" valve springs contribute considerably to the high-speed efficiency of this engine and, because of all factors entering into their design, so-called "flutter" at high speed is reduced to a minimum; therefore, *it is of vital importance that they are never compressed to a length of less than* $1\frac{7}{32}$*", otherwise they will take a permanent "set" and the engine efficiency will be impaired.*

A soft steel scraper should be used to remove all traces of carbon from the surfaces of the cylinder block, valves and pistons. Care should be exercised to not allow any carbon to fall between the pistons and cylinder walls.

The valves should be removed from the cylinders. The exhaust valves, being made of silchrome steel, are so hard that valve grinding compound will make a very slight impression upon them. Therefore, it is necessary to grind their beveled surfaces in a *valve refacing grinder* before attempting to grind the seats. It is advisable to grind the inlet valve faces in the same manner to eliminate excessive grinding away of the valve seats.

After the valve faces have been machine-ground, a thin coat of medium valve grinding compound should be applied to the valve face. Excessive quantities of grinding compound should be avoided.

The grinding operation can be facilitated by placing a light coil spring, of sufficient weight to lift a valve, under the head and then the valve returned to the port from which it was taken. With a screwdriver or grinding tool the valve should be oscillated, occasionally relieving pressure to allow the spring to lift the valve from the seat. A valve being ground should not be turned throughout a complete revolution because this has a tendency to cut grooves in the seat. After having oscillated the valve for a few minutes, it should be removed and the valve grinding compound wiped off the valve as well as the valve seat.

A lead pencil mark should be placed across the bevel face of the valve at intervals of about $\frac{1}{4}$" entirely around the circumference, the valve replaced in its seat and turned about $\frac{1}{4}$ revolution, exercising light pressure. If all pencil marks are broken, a good seat is indicated.

When grinding is completed, the valves should be removed and washed, as well as the valve seats, with water or kerosene to remove all of the valve grinding compound. Positively none of the compound should be allowed to reach the valve guides or cylinders. All valves should be treated in the same manner.

Valves, seats, and guides should be lubricated immediately after grinding in order to prevent rusting, especially if water grinding compound has been used. The valves should next be installed and the timing checked and tappets adjusted as described on Page 21 under "To Check Valve Timing".

Carbon should be removed from the cylinder head with a scraper or wire brush. All traces of carbon should be wiped from the milled surfaces of the cylinder head and cylinder block, as well as both faces of the cylinder head gasket. The spark plug electrodes should be adjusted to a gap of .027". It is important that this gap be adjusted equal on all spark plugs.

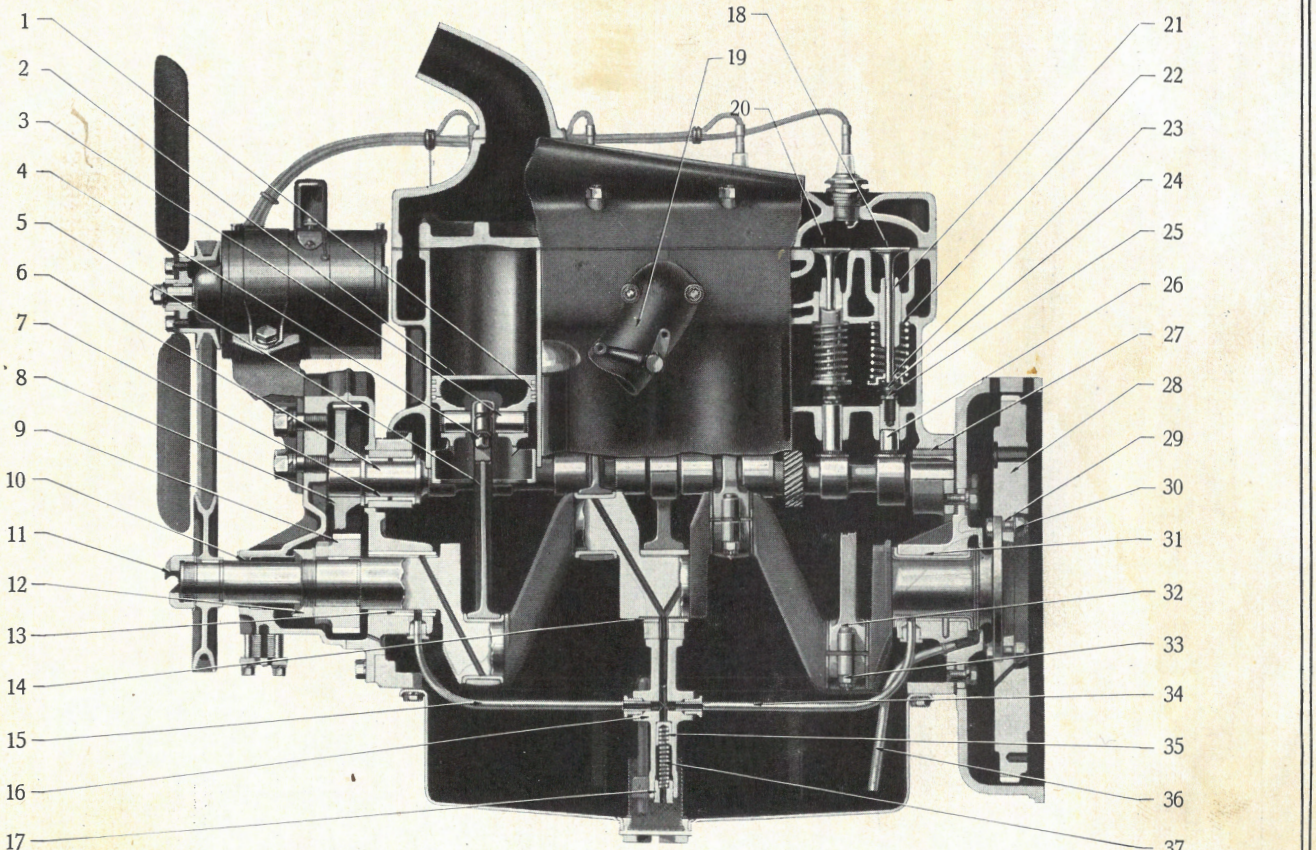


Fig. 5—Side Sectional View of Engine

The cylinder head may next be assembled, exercising care that it is made equally tight all around. Shellac, white lead, or other compounds should never be used on the surface of cylinder head gaskets. All of the cylinder head stud nuts should be turned down just tight enough to touch the cylinder head, then each nut should be given one turn, beginning with the center stud and working toward each end, repeating this operation until the head is tight, further repeating this operation when engine is warm.

After filling the cooling system with clean water, the engine should be allowed to run for about 30 minutes and the valve tappet adjustment checked when the engine is warm. The valve cover plate should next be assembled and the cylinder head stud nuts tightened again.

The nuts holding the valve cover plate in place should be tightened sufficiently to prevent oil leakage.

Cooling System

The radiator is of the vertical tube type, connected to the engine by short pieces of hose. The fan, mounted at the end of the generator, is driven by the crankshaft through a V-type rubber cord belt.

The cooling system is of the thermo-siphon type; the circulation of the water is caused by the difference between the weights of cool and warm water. When the engine starts, the water in the water jacket becomes heated, rises to the top of the water jacket and passes into the top of the radiator through the upper hose connection. At the same time the cool water in the radiator flows downward through the radiator tubes and through the lower hose connection into the engine water jacket.

The cool water in passing downward through the radiator tubes draws after it (siphons) from the top of the radiator the warm water which, in passing through the radiator, has its heat extracted by the thin fins attached to the metal tubes. The fins and tubes give this heat to the air, which is drawn between the radiator fins by the fan.

It is necessary that the radiator be kept full of clean water at all times, as thermo-siphon action is impossible without a full radiator.

Care

The cooling system should be drained (drain cock at bottom right corner of radiator) and flushed occasionally to remove dirt and sediment. If the radiator is removed from the car, the ideal way to flush the radiator is to

Fig. 5—Side Sectional View of Engine

1—Piston rings
2—Piston
3—Piston pin
4—Piston pin clamp screw
5—Connecting rod
6—Camshaft
7—Camshaft front bearing
8—Camshaft gear
9—Crankshaft gear
10—Crankshaft oil seal
11—Crankshaft starting jaw
12—Crankshaft gear lock nut
13—Crankshaft front bearing
14—Crankshaft center bearing
15—Front bearing oil feed tube
16—Oil distributor body
17—Oil relief valve spring plug
18—Exhaust valve
19—Water inlet pipe
20—Inlet valve
21—Valve guide
22—Valve spring
23—Valve spring retainer
24—Valve tappet adjusting screw
25—Valve tappet adjusting screw nut
26—Valve tappet
27—Camshaft rear bearing
28—Flywheel
29—Flywheel bolt
30—Flywheel bolt nut
31—Crankshaft rear bearing
32—Connecting rod bolt
33—Connecting rod bolt nut
34—Crankshaft rear bearing oil feed pipe
35—Oil relief valve plunger
36—Rear bearing drain pipe
37—Oil relief valve spring

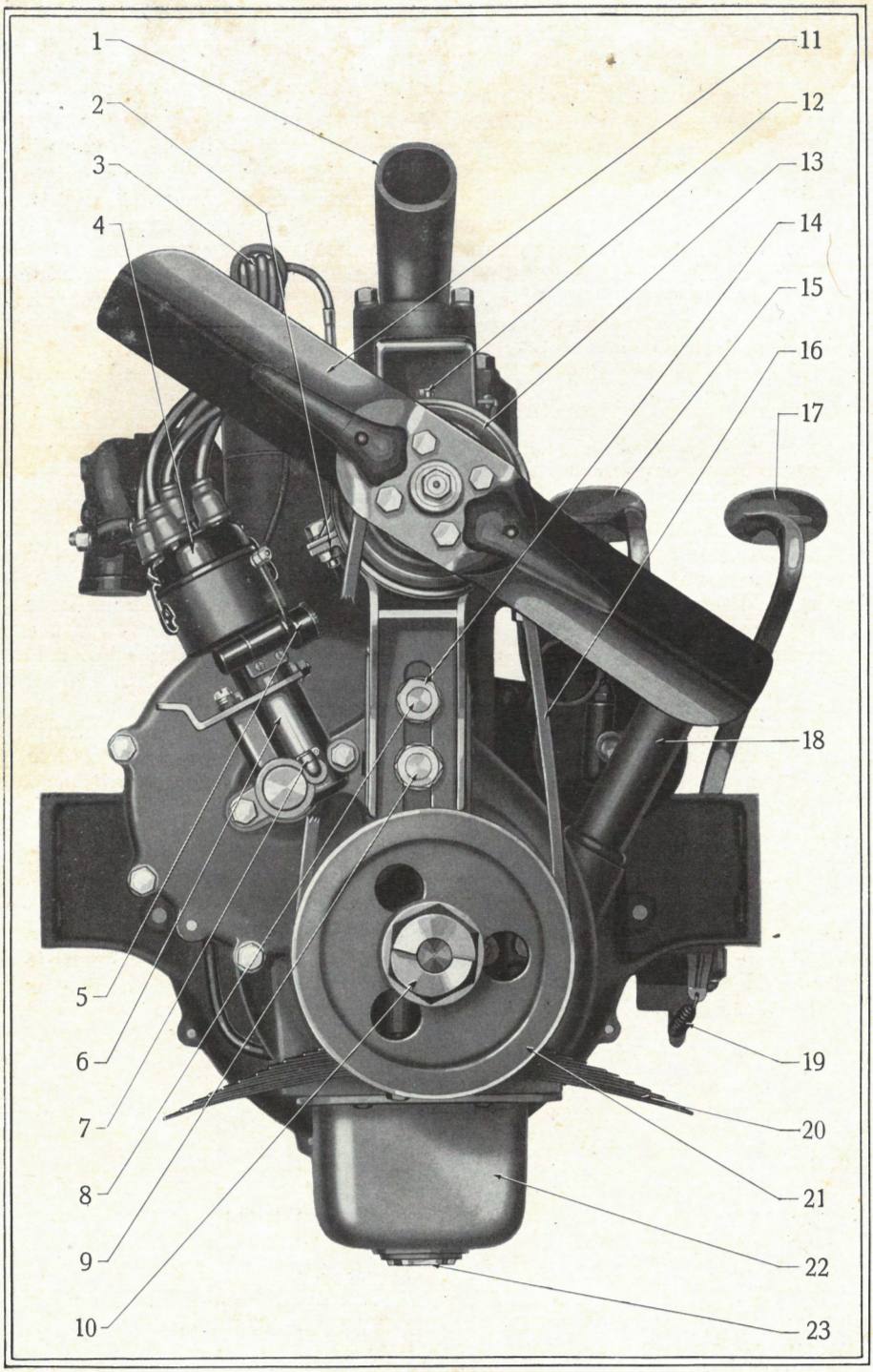


Fig. 6—Front View of Engine

invert it and force the water through the bottom connection to remove large particles collected in the top tank. Very hard or lime water should not be used in the system. Because of the scale-forming chemicals it contains, its use will cause scale to form on the walls of the inside of the radiator and cylinder water jackets, which in a short time will restrict the circulation of water. The water passages in the radiator core are very small and if care is taken to use soft water at all times these small water passages will not become clogged with the scale, which is very difficult to remove.

Lead and oil paint should never be put on the radiator core because it forms an insulation that retards dissipation of heat.

Hose connections should be kept tight. Soft hose should be replaced with new, firm pieces. The mounting studs and screws holding the core in the shell must be kept tight. Radiator compounds or other liquids should not be used for stopping small leaks because they generally block the passages in the radiator, which necessitates an overhauling.

Steaming

When steam comes out of the radiator it is an indication that the water is not circulating properly or that an insufficient supply of water is in the system. Very often if the water in the radiator is frozen, the radiator will emit steam, because ice has obstructed the circulation, and the water around the cylinders is being boiled. A frozen cooling system should be thawed as promptly as possible. There is a great possibility of ice causing much damage to the engine water jackets and radiator, especially if the overflow pipe in the radiator is clogged.

If an engine is run at a high temperature due to an insufficient supply of water or obstructed water circulation, care must be taken to allow the engine to cool before refilling the radiator. Cold water making contact with an extremely hot cylinder is liable to crack the cylinder casting.

Adjustments

The fan belt is adjusted by raising the generator cradle. The cradle is held in place by nuts on the outer end of studs which pass through a slotted hole in the base of the cradle and by loosening the nuts the cradle may be moved up or down as required. The belt should not be adjusted tight; it should only be brought to a snug tension.

Non-Freezing Solutions

At the first indication of freezing weather the cooling system should be filled with a good non-freezing solution. Denatured alcohol and water

Fig. 6—Front View of Engine

1—Water outlet elbow
2—Generator cradle
3—Spark plug wires
4—Distributor
5—Grease cup
6—Distributor base
7—Oil cup
8—Generator cradle stud
9—Generator cradle stud
10—Crankshaft starting jaw
11—Fan blade
12—Oil cup
13—Fan and generator pulley
14—Generator cradle stud nut
15—Brake pedal
16—Fan belt
17—Clutch pedal
18—Oil filler and breather tube
19—Clutch pedal pull-back spring
20—Engine support spring
21—Fan and generator drive pulley
22—Oil pan
23—Oil pan drain plug

in proper proportions make a very good solution, but care should be taken to prevent its spilling on the Duco finish of the car. If this does happen, the solution should be wiped off the Duco finish as quickly as possible to avoid spotting or bleaching the finish, because alcohol is a solvent of Duco.

Alcohol evaporates from water and, when refilling the radiator is necessary, it is generally best to refill with clear denatured alcohol instead of water. Such a solution should be tested about once a week to make certain that it will not freeze in the prevailing temperatures.

Under no circumstances should a calcium chloride solution be used. It has a chemical action on different metal parts of the entire system and in a short time will cause damage.

The following formula is dependable for a good non-freezing solution at the temperatures indicated:

Freezing Point Fahrenheit	Amount of Alcohol	(*See Note*)	Specific Gravity
20°	15%	2 qts.	.981
10°	25%	3½ qts.	.971
0°	35%	5 qts.	.959
—10°	40%	5½ qts.	.951
—20°	45%	6¼ qts.	.943
—30°	50%	7 qts.	.933

Note: The quantity indicated is proper for the Chrysler "52", which has a capacity of 3½ gallons in the cooling system.

Fuel System

Supply Tank

The fuel supply tank has a capacity of 11 gallons, U. S. measure, and is suspended from the rear of the frame. Fuel is drawn from this tank by suction to the vacuum tank on the dash under the hood, whence it flows by gravity to the carburetor. The plug in the bottom of the fuel tank should be removed when necessary to allow dirt and sediment to drain out of the tank. The air hole in the fuel tank filler cap should be kept open.

Fuel Gauge

The fuel gauge is located at the right hand end of the fuel tank and is provided with an indicating dial under a glass cover. A cork float attached to a suitable rod floats on the top of the fuel and as the level of the fuel raises or lowers the float rod, through a geared connection, moves an indicating hand on the dial of the gauge. The dial is marked with the letters "E" (meaning empty) and "F" (meaning full), also ¼, ½ and ¾, which by means of the indicating hand shows the quantity of fuel in the tank.

If the occasion should ever arise, the gauge may be removed from the tank by unscrewing the metal cap, over the glass, and lifting the unit out of the tank by hand.

Vacuum Tank

The driver will seldom experience any difficulty with the vacuum tank as long as the suction and fuel lines are kept tight and clean. The valve in the bottom of the vacuum tank operates in a standpipe which forms a sediment trap and should be opened occasionally, particularly in winter months, to allow the water and sediment to drain off.

The vacuum, which draws the fuel from the supply tank at the rear of the car to the vacuum tank on the dash, is created by the engine oil pump and when the oil supply in the oil reservoir of the engine becomes exhausted the vacuum is lost, with the result that no fuel can be drawn into the vacuum tank. The vacuum may also be lost by a leak at one or more of the connections of the vacuum pipe between the oil pump and the vacuum tank and for this reason the connections must be kept tight at all times.

If, for any reason, the supply of fuel in the vacuum tank and the supply tank becomes exhausted, the supply tank should be filled and it is advisable, but not always necessary, to pour about one pint of fuel into the filler hole at the top of the vacuum tank. This will avoid the possibility of exhausting the energy of the storage battery while endeavoring to start the engine if a sufficient vacuum is not created by the engine to quickly fill the vacuum tank.

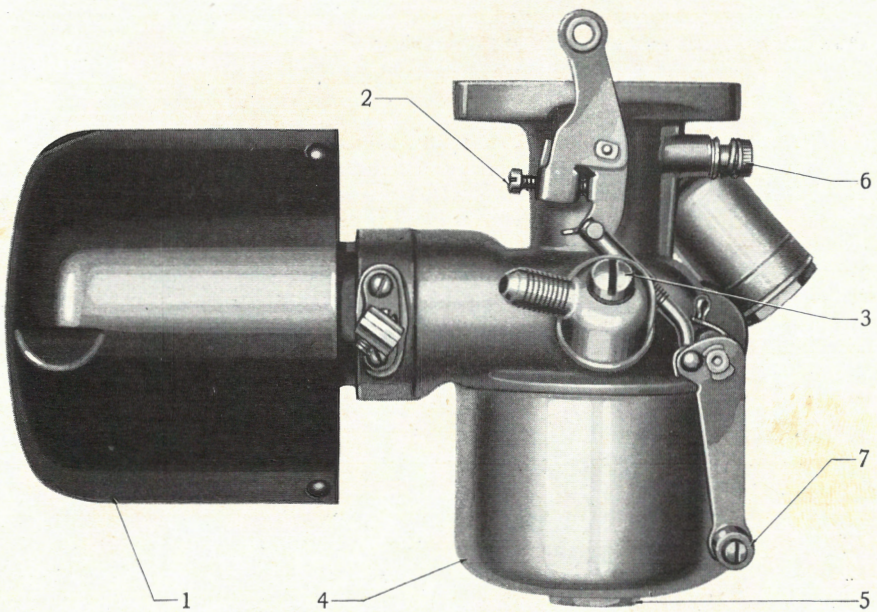


Fig. 7—Carburetor and Air Cleaner

1—Air cleaner
2—Closed throttle adjusting screw
3—Strainer cap screw
4—Float bowl
5—Float bowl nut
6—Idle mixture adjusting screw
7—Choke wire lock screw

Carburetor

The idle mixture and closed throttle running are controlled by the idle adjustment screw ("6", Fig. 7). This operates on the air so that turning it clockwise gives a richer mixture and anti-clockwise a leaner mixture. If after adjusting the idle adjustment screw as above described the engine idles too fast, the throttle stop screw "2" should be turned anti-clockwise. These are the only adjustments provided on the carburetor. The jets in the carburetor are so calibrated that the engine must not be operated with the air cleaner removed. The result will be a leaner mixture of gas.

The choke lever operates on a cone in the air inlet passage and is raised when in the closed position or with the choke button fully withdrawn from the instrument panel.

The choke control wire is held in place on the choke lever by means of the screw "7". When the choke is closed the throttle is opened slightly by means of a small rod connecting the choke lever and the throttle lever. This facilitates starting in cold weather and should not be adjusted.

The float is a hollow metal ring contained in the float chamber. As fuel is admitted to the carburetor, the float rises and touches a needle which shuts off the supply of fuel as soon as it reaches the proper level. Too rich a mixture at all speeds, except idling, usually indicates a heavy float which is caused by fuel being admitted inside the float. This is caused by a leak in the float and, if it is desired to determine whether or not the float leaks, the screw "5" should be removed and the float bowl removed from the float chamber. The float can then be removed readily. Shaking the float will cause the fuel, if any, to slash around in the float which can easily be heard if held close to one's ear.

Cleaning

A strainer is housed under the fuel line connection and held in place by the screw "3" which should be removed once every two or three months and thoroughly cleaned. If turning the idle adjustment screw "6" does not affect the idle running of the engine, the plug "5" should be removed and the jets cleaned by blowing through the bottom end of the jets. It will be noted that a very small hole is drilled in the jets and a fine piece of foreign substance may partially or totally fill this hole, which would retard the flow of fuel. A hard substance such as a wire should not be used for cleaning the jets because it is liable to enlarge the holes in the jets, which will materially affect the running of the engine.

Air Cleaner

The air drawn into the carburetor contains a certain amount of dust which is an abrasive, and if allowed to enter the cylinders will cause more rapid wear of the pistons, rings, cylinders, and it gradually works into the oil pan and is circulated through the engine. The air cleaner "1" (Fig. 7) removes the dust from the air before it enters the carburetor by centrifugal force of the air currents within the air cleaner and throws it down into the open space beside the engine. The draft from the radiator cooling fan drives the dust past the engine.

The air cleaner requires no attention and does not operate at low engine speeds.

Electrical System

The six-volt, one-wire system is used. The several units composing the system are: the starting motor, generator, relay, ignition timer, distributor and coil, storage battery, lights and horn.

Several of the above units are grounded; that is, the car frame serves as one conductor for the current. When any unit is disconnected from the system, the exposed terminals should be taped to prevent them from grounding (touching) on any metallic part of the car. Should this occur it would short-circuit either the generator or the storage battery, and would probably damage either or both of these units beyond repair. The cables and wires should be inspected occasionally to make sure that none is rubbing against a sharp edge, as such rubbing or chafing wears away the cable insulation and short-circuits the cable, with the attendant danger of fire or damage to the storage battery.

All terminals and terminal binding nuts should be kept tight and free from dirt and oil. An occasional inspection of the electrical equipment by an experienced automotive electrician is advisable because it reduces the possibilities of trouble on the road.

Starting Motor

The starting motor is mounted on the left side of the flywheel housing and held in place by cap screws passing through the flange of the starting motor body.

The starting motor pinion is automatically meshed with gear teeth in the flywheel when the starting motor armature is caused to revolve by means of the electric current. As soon as the engine starts running on its own power the starting motor pinion is automatically disengaged from the flywheel gear.

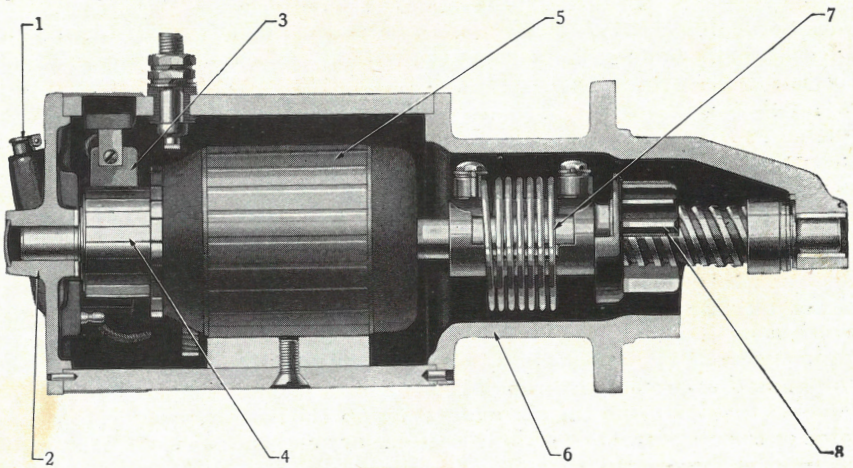


Fig. 8—Starting Motor

1—Oiler
2—Commutator end bearings
3—Brush
4—Commutator
5—Armature
6—Bendix housing
7—Bendix spring
8—Bendix gear

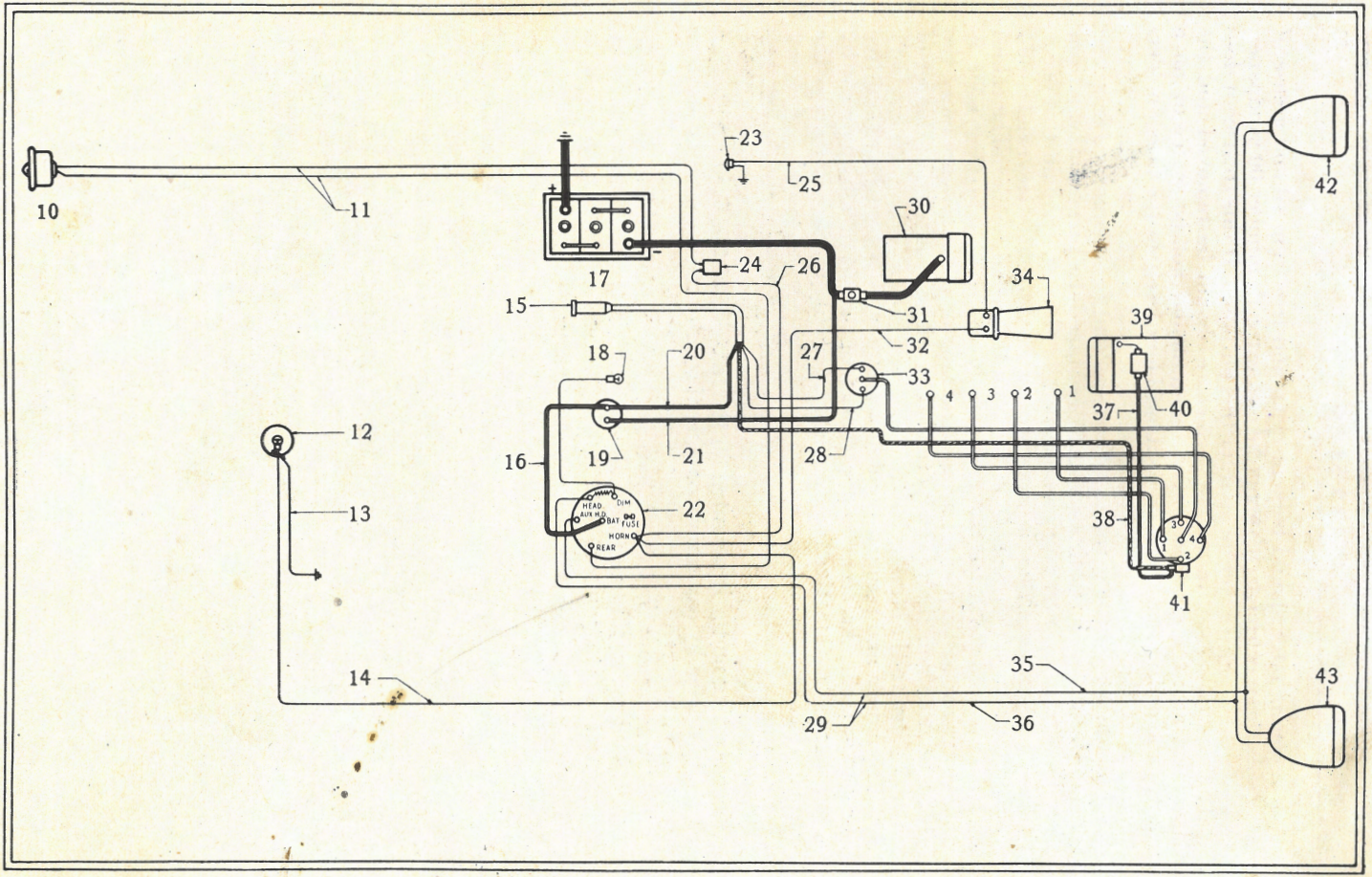


Fig. 9—Wiring Diagram

The commutator should be kept clean and free from oil and grease; if it appears dirty or rough, it should be cleaned with number 00 sandpaper. Emery paper should never be used for this purpose. If this treatment does not smooth the commutator, the armature should be removed and the commutator turned in a lathe. The mica should not be undercut on a motor commutator. The brushes should move freely in the brush holders

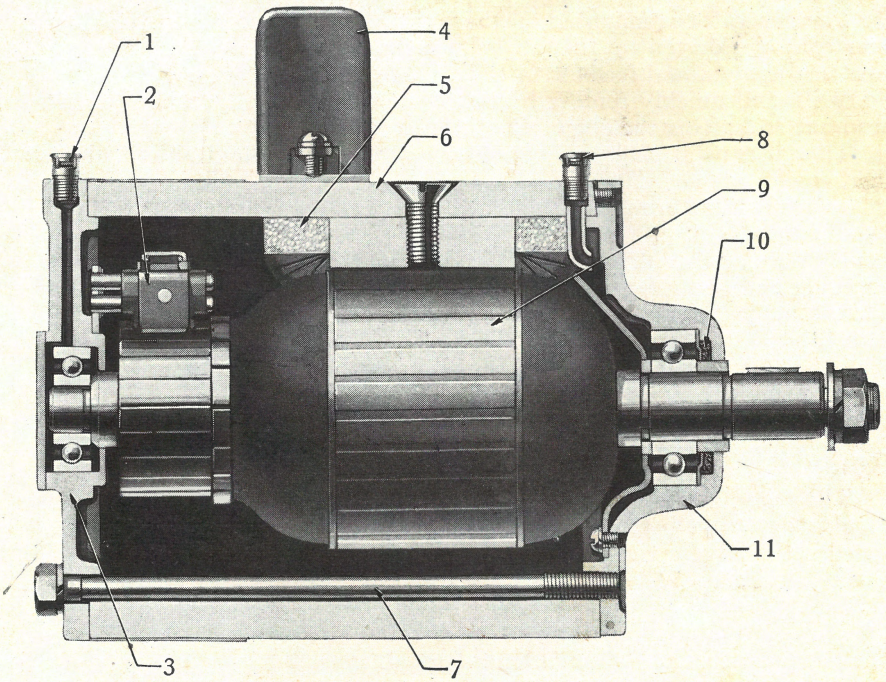


Fig. 10—Generator

1—Oiler
2—Brush
3—Commutator end bracket
4—Relay
5—Field coil
6—Frame
7—Assembly bolt
8—Oiler
9—Armature
10—Oil retaining felt washer
11—Drive end bracket

Fig. 9—Wiring Diagram

1-4 Spark plugs
10—Tail and signal lamp
11—Small armored black braid
12—Dome lamp and switch (Sedans only)
13—Small black braid
14—Small red braid
15—Ignition switch and lock
16—Medium black braid
17—Battery
18—Instrument lamp
19—Ammeter
20—Medium black braid
21—Medium armored red braid
22—Ignition and lighting switch
23—Horn push button
24—Signal lamp switch
25—Small armored black braid
26—Small armored red braid
27—Small light brown braid
28—Small black braid
29—Duplex armored cable
30—Starting motor
31—Starter switch
32—Small black braid
33—Ignition coil
34—Horn
35—Small light brown braid
36—Small green braid
37—Medium black braid
38—Ignition switch to distributor cable
39—Generator
40—Generator relay
41—Ignition distributor
42—Headlamp
43—Headlamp

and the full contact area should bear on the commutator. The locations of the brushes should never be changed as they are properly set when the motor is built.

The oiler for the commutator end bearing of the starting motor should receive a few drops of light engine oil every 5000 miles.

Generator

The generator is mounted on the front of the engine above the timing gear case and driven by the fan belt. It generates current for the entire electrical system and feeds it to the storage battery. The generator may be easily and quickly removed by loosening the support bracket (cradle) stud nut and lifting the assembly off the engine.

The oil cups at each end of the generator frame should be filled with light engine oil every 2000 miles.

The generator begins charging at 8 to 10 miles per hour and reaches its maximum output of 16 amperes (with cold generator) at 20 to 22 miles per hour. For ordinary driving the rate should never exceed 17 amperes. The charging rate may be regulated by rotating the "third" brush holder. This is made accessible by removal of the commutator end cover band. The "third" brush rocker ring clamp screw at the rear of the generator may then be loosened and the "third" brush holder rotated in the direction of armature rotation to increase the rate or against armature rotation to decrease.

Relay

The relay, assembled on the top of the generator frame, automatically breaks the circuit between the generator and the battery when the engine speed is too low for the generator to charge the battery. It automatically closes the circuit at the proper engine speed so the generator can charge the battery.

The relay requires no lubrication or other attention. The adjustment of the movable arm should not be disturbed.

Distributor

The distributor, which is of the single breaker arm type with condenser on the outside of the base, is accessibly mounted above the timing gear case and driven through a shaft from the camshaft. The opening of the breaker points by the cam on the distributor shaft interrupts the flow of primary current, which induces an electro-motive force in the secondary winding of the coil, mounted on the dash. The high-tension current is delivered to the center terminal of the distributor cap, and thence through the rotor to the spark plugs. The cylinders are fired in the order 1-3-4-2.

To Adjust Point Opening

The rotor should be removed and the engine turned until the breaker arm rests on a high point of the cam. The gap should be from .015″ to .020″ and may be measured by standard feeler gauges. If necessary to correct the adjustment of the gap the lock screw on the contact plate should be loosened and the adjusting screw turned as required. (Fig. 11.) The breaker arm should move freely on its pivot and it is advisable to check the tension of the breaker arm spring.

Ignition Coil

The ignition coil needs little attention other than to be kept clean, dry, and well grounded. All terminals on the coil must be tight.

Spark Plugs

The gap between the spark plug points must be .027″ to .030″. Too wide a gap will cause misfire, especially at high speeds and when laboring with open throttle, while a small gap causes poor idling. Dirty or fouled spark plugs should be washed in gasoline. Uniform gap setting insures evenness of engine firing.

The porcelain on the top of the spark plugs should be kept clean at all times. Oil or dust on the porcelain will cause leakage of the spark and in damp weather may prevent starting.

Present day engines develop high compression and very high speed. This severe duty imposed on the spark plugs causes erosion. It is, therefore, advisable to replace spark plugs at intervals of every 10,000 miles of

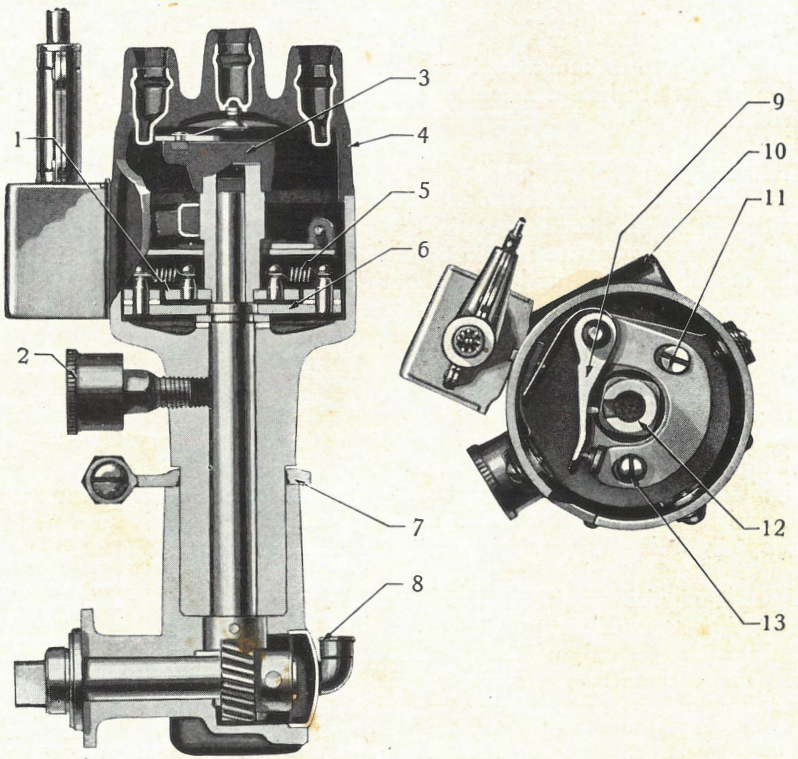


Fig. 11—Distributor

1—Governor weight
2—Grease cup
3—Rotor
4—Distributor cover
5—Governor spring
6—Governor weight plate
7—Timing lever
8—Oiler
9—Breaker arm
10—Condenser
11—Breaker point plate adjusting screw
12—Cam
13—Breaker point plate lock screw

service. The installation of new spark plugs, properly adjusted, will have a marked effect upon the performance of the engine and aid materially in keeping the engine in condition for smooth flowing maximum power.

The engine performs best with the spark plugs furnished with the car. These are obtainable from Chrysler Service Stations and should be used to the exclusion of all others. The use of so-called carbon-proof spark plugs and others having smaller diameter electrodes should be avoided. Such spark plugs will cause the engine to miss on heavy pulls.

Suggestions

Ignition trouble will make itself known by the engine misfiring or refusing to start.

If the engine misses regularly on one cylinder, the trouble is usually due to the spark plug in that cylinder being dirty, broken or improperly adjusted. If misfiring is not limited to one cylinder, the cap should be removed from the distributor and the contact points examined to make certain that they make good contact with each other and are clean. The correct point opening is from .015″ to .020″.

If the contacts show a tendency to burn, the distributor may not be well grounded to its mounting bracket. Paint and dirt should be scraped off the bracket to insure a good ground. The condenser, which is on the distributor, should be tested and its connections from the distributor should be tight.

When the engine will not start, the ignition should be checked as follows: The ignition switch should be turned "on" and the cap removed from the distributor to see that the contact points are touching each other. Then the secondary wire should be disconnected from the center terminal of the distributor cap and held about ⅛″ from some metal part of the engine. The contact points should next be separated by moving the breaker arms with the fingers. A spark should jump between the end of the high-tension cable and the metal part of engine, if the coil and its connections are in good condition.

If no spark is obtained under the above conditions, it should be determined whether current passes through the coil.

A quick check may be made on the primary circuit of the coil by closing the ignition switch and cranking the engine. If the ammeter needle moves back and forth between 0 and 3 or 4 amperes discharge, it indicates the primary circuit is all right. If ammeter needle does not move, the following procedure should be observed:

With the ignition switch turned "on" and the distributor contact points separated, a screwdriver should be rested over the edge of the distributor housing with the end of the screwdriver touching against the breaker arm. There should be a flash or spark to indicate the flow of current. If current flows, the secondary winding of the coil is apparently damaged and a new coil should be installed.

If no current can be detected on this test, the small wire from the coil to the distributor should be examined for breaks, loose connections, or damaged insulation.

If the wiring is in good condition it should be determined whether the current reaches the coil. A screwdriver should be rested over the "Bat" terminal of the coil and at the same time touch some metal part of car

with the end of the screwdriver. If a flash or spark is obtained, the coil is faulty and a new one should be installed. If no current reaches the coil, the trouble is due to a loose connection, broken wire, defective switch, dead battery, or poor ground connection.

To Set Ignition Timing

The breaker points should be adjusted to .020" opening and the manual spark control lever set in the fully advanced position. The crankshaft should be rotated until No. 4 piston is going up on exhaust stroke and stopped when the piston is .063" (.004" for "Red Head") before top dead center. The screw which clamps the distributor timing lever to the distributor should be loosened and the distributor cap removed to see that the rotor brush is at No. 1 spark plug cable terminal. The distributor should next be rotated in an anti-clockwise direction, as viewed from above, until No. 1 cam begins to separate the breaker points. When doing this the distributor rotor should be pressed against the direction of rotation to be certain that all backlash is removed. The clamp screw should then be tightened and the distributor cap reinstalled as well as the spark plug cables connected to the proper spark plugs and terminals on the distributor cap. The spark control hand lever should be checked for full advance and retard.

Firing Order

The firing order of the cylinders is 1-3-4-2. The wires from the spark plugs should be connected to the terminals on the distributor corresponding with the number of the cylinder in which the spark plugs are placed. Number 1 cylinder is nearest the engine.

The wiring diagram (Fig. 9) indicates the location of the distributor terminals for the different spark plugs.

Spark Advance

For all ordinary road driving the spark control hand lever should be in the advanced position, which is toward the top of the steering wheel. When pulling hard with a wide open throttle, but not at high vehicle speed, the spark should be retarded by moving the control lever about half way down. When cranking the engine by hand, the spark lever should be all of the way down. The automatic advance will take care of all other conditions.

Lights

The head, parking, tail and instrument panel lights are all controlled by the same lever. With the lever in the vertical or central position, no connection is made. When the lever is turned to the right, the parking lights are illuminated. When the lever is turned to the first notch to the left (from center), the dim head and tail lights are connected. When the lever is turned to the next notch to the left, the bright head lights and the tail light are connected. The ignition is connected by turning the key (Fig. 28).

Signal Lamp

A switch connected to the brake pedal completes the circuit for the rear signal lamp whenever the brake pedal is depressed.

Ignition Switch and Lock

The ignition switch is assembled to the left end of the instrument board and operated by a milled key. When the switch is turned "off" the circuit is broken and the distributor grounded which prevents starting the engine.

New keys for this switch may be obtained from a Chrysler Service Station after the serial number of the keys is given. The keys will then be ordered from the Chrysler Sales Corporation, who, in turn, will make new keys and forward them to the Chrysler Service Station which ordered them. No more than two keys may be ordered and they will be shipped only to authorized Chrysler Service Stations. These rules are necessary for the protection of Chrysler owners.

Headlamp Adjustment

The car should be placed with normal passenger load on a level surface with the headlamps located twenty-five feet from a garage door or light-colored vertical wall.

A horizontal line should be drawn on this surface at a height of the lamp centers. A center point should be located on this line by sighting through the center of the rear window of the car and in line with the radiator cap. Equidistant from this center point two vertical lines should be drawn at a distance from each other equal to the distance between the centers of the headlamps. If this is done correctly, these two lines will be immediately ahead and in line with the respective headlamps.

With the lighting switch lever in the "BRIGHT" (second to left) position one headlamp should be adjusted while the other is covered. The best driving light beam is obtained when there is a high intensity near the top of the beam. This is accomplished by turning the adjusting screw accessibly located at the rear of the lamp. When properly adjusted, the light will be intense at the top and shallow in height as well as quite widespread. By loosening a single nut, which fastens the lamp to its brackets, the light beam

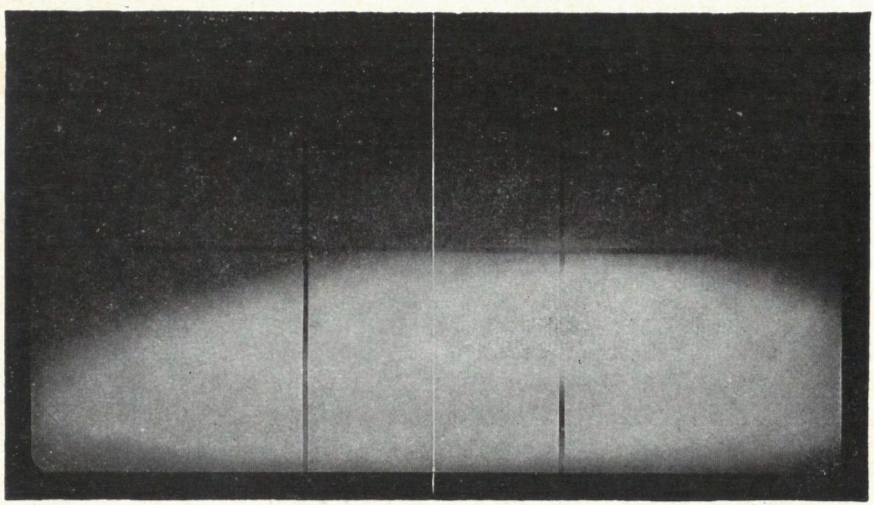


Fig. 12—Rays of Light from Right Hand Headlamp

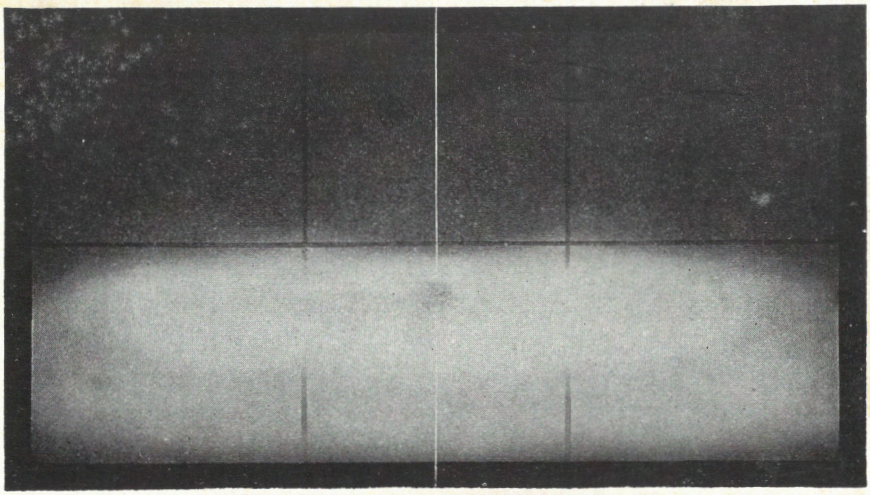


Fig. 13—Rays of Light from Both Headlamps

may be adjusted in both vertical and horizontal directions. Fig. 12 illustrates the rays of light from the right hand headlamp when properly focused and aimed.

When one lamp has been properly adjusted, it should be covered and the other lamp uncovered, then the necessary adjustments made to the latter. After both lamps have been properly adjusted and uncovered, the light should appear as shown in Fig. 13.

Flickering lights indicate a loose connection, usually at the light sockets or the terminals on back of switch. The fuse should be inspected to see that it is tight in the fuse clips.

Battery

The battery is of a six-volt, three-cell type and is carried under the front floor board. When installing a battery, care must be taken to make certain that the positive terminal is grounded and that the negative terminal is connected to the starting and lighting cable before attempting to use any part of the electrical system. Damage may be done to the entire system if the wrong connections are made.

The starting motor foot button should never be held "in" for a period to exceed 10 or 15 seconds. Continual cranking of the engine will discharge the battery until it is no longer able to supply sufficient current to turn the starting motor. If the engine fails to start, the procedure on Page 67 should be followed. The clutch should be disengaged when cranking the engine to reduce the load on the battery, especially during cold weather.

When storing the car for an extended period, the battery should be removed and delivered to a battery service station for attention during the period of car storage.

Care of Battery

The battery must be kept securely fastened in its rack. It should be cleaned and dried frequently. The terminals and connections should be

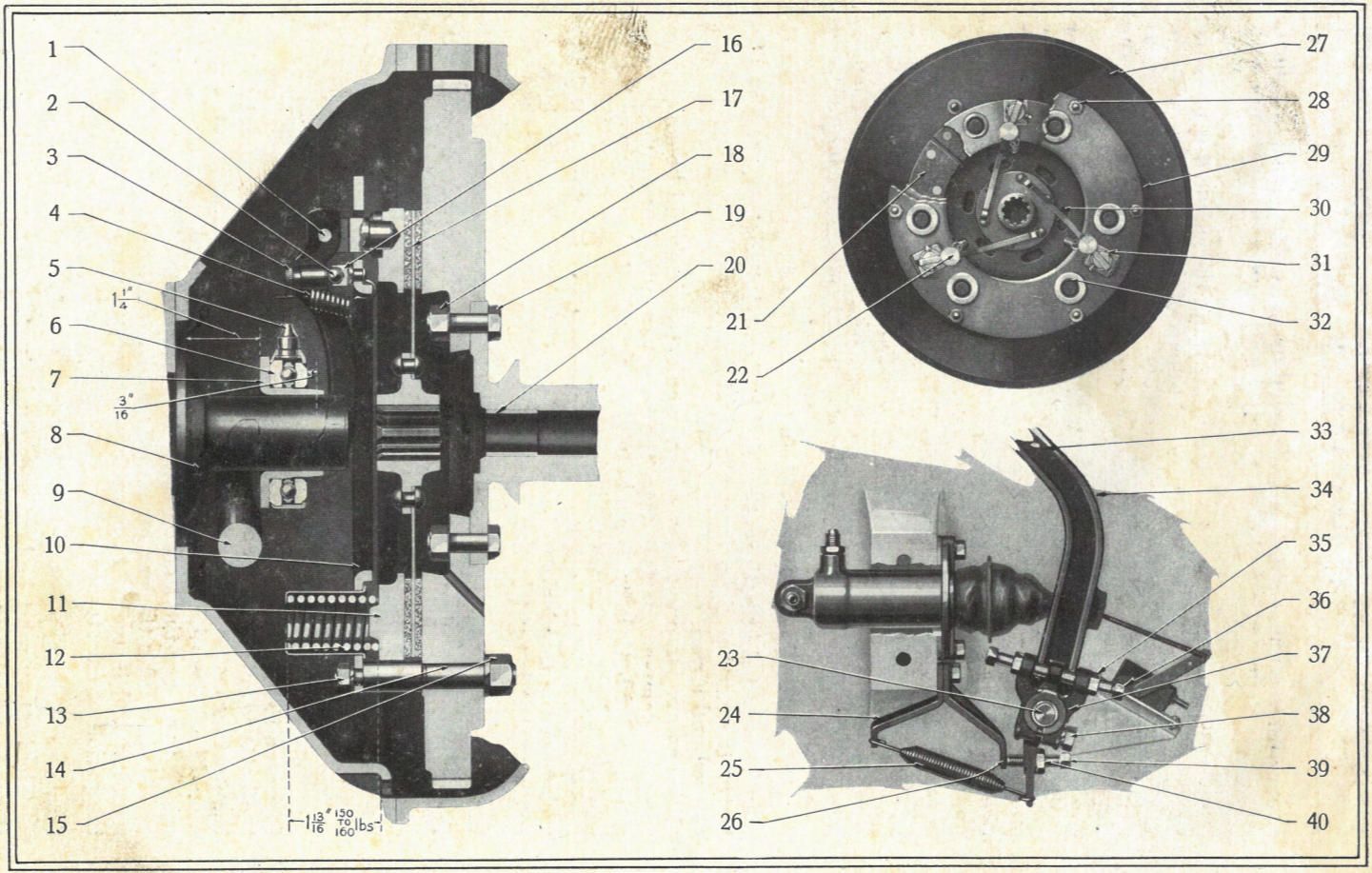


Fig. 14—Clutch and Pedal Adjustments (Four-Wheel Brake Equipment)

coated with vaseline or grease. If the solution has been slopped or spilled, the surface of the battery should be wiped with a piece of waste, wet with ammonia.

If a sufficiently charged battery will not crank the engine it is probable that there is corrosion at the battery clamps and posts. In this case the clamps should be removed and all corrosion scraped from them, as well as the posts, to insure proper contact. The ground terminal and frame at the point of contact should also be scraped.

The electrolyte in the battery should always be maintained at the proper level and pure distilled water added to each cell of the battery until the solution is about ½" above the top of the plates. If distilled water is not available, clean rain water will be satisfactory. Acid or electrolyte should only be added to a battery by an experienced battery repairman. The filling hole plugs should be screwed in by hand.

The specific gravity of the solution in each cell should be tested occasionally with a hydrometer before adding water. If the reading is above 1.200 the battery is more than half charged. If it is below 1.200, but above 1.150, the battery is less than half charged, and is a warning to use the lights sparingly until the specific gravity is restored to at least 1.250. If one cell regularly requires more water than the others, it is probably due to a leak and should be repaired at once. If there is no leak and one cell shows a specific gravity markedly lower than the others, there is a short-circuit or some other trouble in that cell and it should have the prompt attention of a good battery repairman.

A fully charged battery will not freeze in temperatures ordinarily encountered. The electrolyte will freeze in a one-half discharged battery at about 20° below zero (specific gravity 1.210). When water is added to the electrolyte in the battery during freezing weather, the battery should be immediately charged (by driving or otherwise) to avoid freezing the water which does not mix with the electrolyte until the battery is charged.

Horn

The horn is of the 6-volt motor-driven type and is adjustable for tone by movement of the flat-headed screw in the rear end of the horn cover on the left side. The round-headed screw on the right side of the cover

Fig. 14—Clutch and Pedal Adjustments (Four-Wheel Brake Equipment)

1—Release lever clevis pin
2—Ball
3—Release lever adjusting screw
4—Spring
5—Oil nipple
6—Release bearing
7—Release bearing sleeve
8—Release bearing sleeve guide (main drive gear bearing retainer)
9—Release fork
10—Back plate
11—Pressure plate
12—Clutch spring
13—Driving stud nut (small)
14—Driving stud
15—Driving stud nut (large)
16—Ball seat
17—Driving disc
18—Flywheel bolt nut
19—Flywheel bolt
20—Main drive gear pilot bushing
21—Clutch facing
22—Release lever adjusting screw
23—Release fork
24—Pull-back spring bracket
25—Pull-back spring
26—Pedal stop
27—Flywheel
28—Driving stud
29—Pressure plate
30—Release lever
31—Pressure plate driving stud and release lever pivot
32—Clutch spring cup
33—Clutch pedal
34—Brake pedal
35—Set screw lock nut
36—Set screw
37—Pedal adjustment collar
38—Adjusting collar clamp screw
39—Pedal stop screw
40—Stop screw lock nut

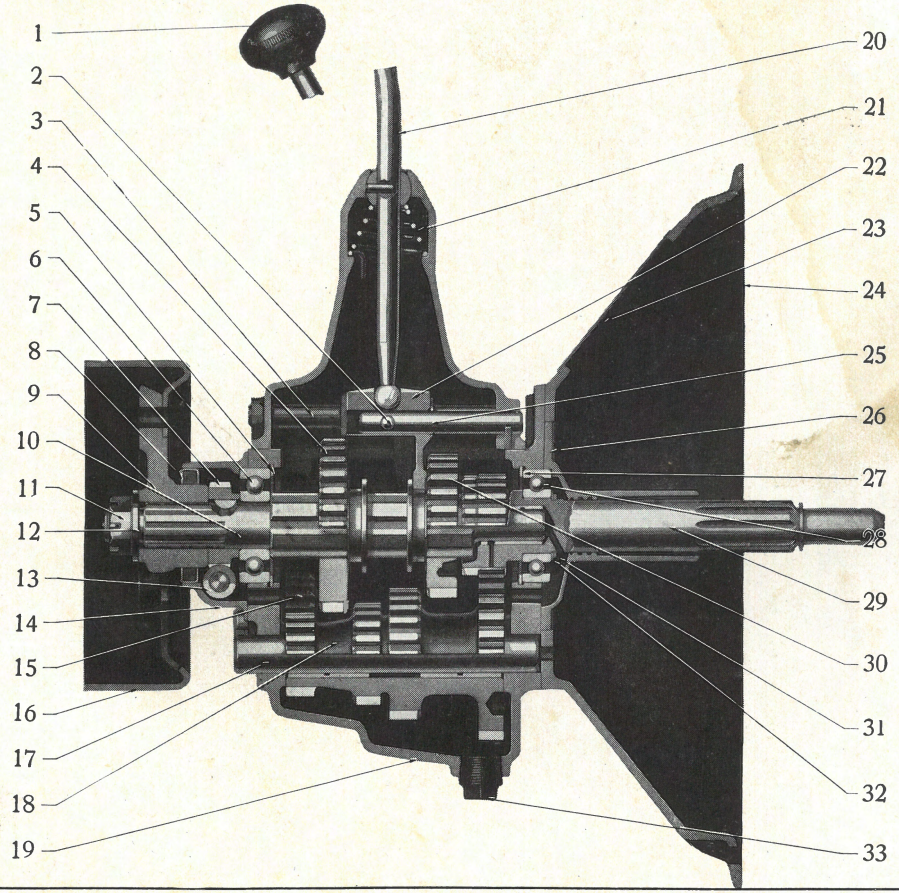


Fig. 15—Transmission

fastens the cover in place and should be removed when lubrication is necessary.

When the cover fastening screw is removed the cover may be removed by pulling it straight backward. Two drops of very light machine oil should be put on the felt washers at each end of the armature shaft about once every three months.

Power Transmission System

Clutch

The clutch is of the single dry plate type, comprising a pressure plate assembly having six pressure springs, three release levers that are provided with knurled nut adjustments spring-locked, and a drop-forged hardened steel splined hub. A driving disc, having asbestos composition facing riveted to each side, drives the splined steel hub and shaft.

A stationary sleeve carries the clutch release bearing. This bearing should be filled with a high-grade fluid gear lubricant every 5000 miles. To do this the clutch housing cover should be removed and lubricant forced with the high-pressure gun through the nipple in the release bear ng sleeve. The clutch should be released for a few seconds with the engine running and the operation repeated in order to pack the bearing thoroughly.

The clutch must be operated dry. A hole is drilled in the bottom of the housing to permit any small leakage of oil, from the rear crankshaft bearing, clutch release bearing, or transmission, to drain off.

Adjustments

Figure 14 illustrates the parts of the clutch assembly and should be referred to in connection with these instructions. The release bearing and pedal must be in their proper positions. This is accomplished by setting the clutch pedal adjusting collar set screw, so that the rear face of the release bearing sleeve is exactly 1¼″ forward of the front face of the drive pinion bearing retainer; that is, the release bearing sleeve should be 1¼″ forward from its rear stop. Then the release fork should be adjusted to locate the pedal as high as possible without interference with the floor board after the release bearing and pedal are in proper relation and engaged position. Next, the three release levers should be adjusted to $\frac{3}{16}$″ clearance at the release bearing and all fingers to make simultaneous contact with

Fig. 15—Transmission

1—Gear shifter lever knob
2—Interlock ball
3—Gear shifter shaft
4—Low and reverse sliding gear
5—Bearing retainer snap ring
6—Main shaft rear bearing
7—Speedometer drive gear
8—Oil washer
9—Universal joint spider
10—Main shaft
11—Main shaft nut
12—Washer
13—Speedometer drive pinion
14—Rear bearing retainer
15—Reverse idler gear
16—Brake drum
17—Countershaft
18—Countershaft gears
19—Transmission case
20—Gear shifter lever
21—Spring
22—Gear shifter fork
23—Clutch hand hole cover
24—Clutch housing
25—Interlock ball shaft
26—Main drive gear bearing retainer
27—Bearing snap ring
28—Main drive gear rear bearing
29—Main drive gear
30—High and second sliding gear
31—Main drive gear snap ring
32—Bearing retaining washer
33—Transmission drain plug

the release bearing. The clutch pedal should have from 1¾" to 2" of free movement before any resistance can be felt.

THE PEDAL ADJUSTMENT SET SCREW POSITIVELY HAS NO CONNECTION WITH THE FREE MOVEMENT OF THE CLUTCH PEDAL, BUT IS ONLY PROVIDED TO ADJUST FOR CLEARANCE AT TOE BOARD AND TO CHANGE THE ANGLE OF THE PEDAL.

The pedal stop screw controls the amount of free play of the pedal. It is imperative, therefore, *to distinguish the difference between these two adjustments.*

The release levers are individually adjustable by turning the adjacent pivot adjusting screw. Anti-clockwise turning of the adjusting screws increases the clearance between bearing and release levers and compensates for wear of frictional members.

The practice of continuously resting the foot on the clutch pedal, while driving, is harmful to the throwout bearing and should be avoided. The weight of the foot holds the clutch throwout yoke against the release bearing with consequent rapid wear and noise, reduces tension of the clutch springs, causing slippage and loss of power; causes rapid wear of the facings, producing sluggish clutch action, rattles and knocks, besides necessitating more frequent lubrication of the bearing. (Page 43.)

The clutch shaft bearing in the crankshaft is self-lubricating and requires no attention except that it is good practice to pack it with vaseline whenever the clutch is removed from the car. The ball bearing at the rear of the clutch shaft receives its lubrication from the transmission.

Transmission

The transmission driving gear is an integral part of the clutch shaft The high-speed gear is of internal tooth type, and the countershaft assembly is in constant mesh. The main shaft operates on a ball bearing in the rear and a bronze bearing in the front (mounted in the main drive gear), and the countershaft gears are fitted with bronze bearings and revolve on a stationary countershaft. There are three forward speeds, one reverse. The gear-shift is standard.

The transmission should be filled to the level of the filler plug on the left side with a high-grade fluid gear lubricant. In winter, in very cold climates, where the atmospheric temperature is below 0° Fahrenheit, this should be thinned by adding one-quarter pint of colorless kerosene. Once a season the case should be drained, washed with kerosene, and refilled with fresh lubricant. (Page 18.)

If it should be necessary to remove the transmission assembly, care should be taken to keep it in perfect alignment with the engine while removing and installing in order to avoid springing of the driving disc, which is manufactured with great precision, also to avoid injury to the clutch shaft pilot bearing. This can be accomplished by supporting the transmission on blocks exactly in alignment with the engine. The transmission is removable without disturbing the clutch.

If it becomes necessary to remove the clutch, the transmission should first be removed. A mark should be placed on the back plate and a driving stud to assure reassembling in the same relative position. The clutch

should be removed and installed independently of the transmission; that is, removed after the transmission and installed before the transmission.

To Install Clutch

A teaspoonful of vaseline should be packed into the main drive gear pilot bearing, and the clutch assembly mounted on the six driving studs. The main drive gear (clutch shaft) should be placed through the hub of the driving disc, and into the main drive gear pilot bearing, and the six flywheel stud nuts tightened. The main drive gear is used as a guide for the clutch parts so as to obtain perfect alignment. Preferably an extra drive gear shaft should be used if available, but, if not, the shaft may be removed from the transmission for this purpose.

The main drive gear may next be removed from the driving disc and the adjusting screws adjusted so that the inner ends of the release levers are in line with the front face (toward front of car) of back plate.

After the clutch is installed as outlined, installation of the transmission may be made and care must be taken while mounting in order to avoid springing of the driving disc and injury to the clutch shaft pilot bearing. The detailed instructions (Page 43) for clutch adjustment should be followed carefully after assembling a clutch and transmission.

Universal Joints

The universal joints consist of forged spiders welded to each end of the propeller shaft and rubberized fabric discs bolted to each spider. Assembled to the rear end of the transmission main shaft and the front end of the rear axle drive pinion shaft are similar spiders also bolted to rubberized discs. However, the bolts holding the discs to the welded spiders pass through the discs midway between the bolts holding the discs to the spiders on the transmission and pinion shafts. The flexibility of the discs permits universal flexing of the propeller shaft group.

The nuts on the bolts which pass through the discs should be kept tight at all times and inspection of this is recommended at intervals of about every five thousand miles. If the nuts are allowed to become loose the bolts will wear the holes in the discs, causing lost motion; the discs should be replaced and it is of vital importance that genuine Chrysler parts, procured from a Chrysler Service Station, be used for the replacement.

Rear Axle

The rear axle is of the semi-floating type with the differential and pinion assembly mounted in a detachable carrier on the front side of the pressed steel axle housing. The rear side of the axle housing is provided with a cover, easily removed for inspection of the differential assembly.

The drive pinion and shaft are integral, having adjustable roller bearings mounted at the front and rear ends of the shaft. The differential is fitted with adjustable roller bearings mounted in the differential carrier on each side of the differential case. The bearings on the outer ends of the axle shafts are likewise adjustable.

The drive pinion shaft and its bearings are carried as an assembly in the differential carrier. The pinion bearing cage is threaded into the differential carrier and when rotated, to the right or left, causes the drive pinion to make tighter or looser mesh with the drive gear. Notches are

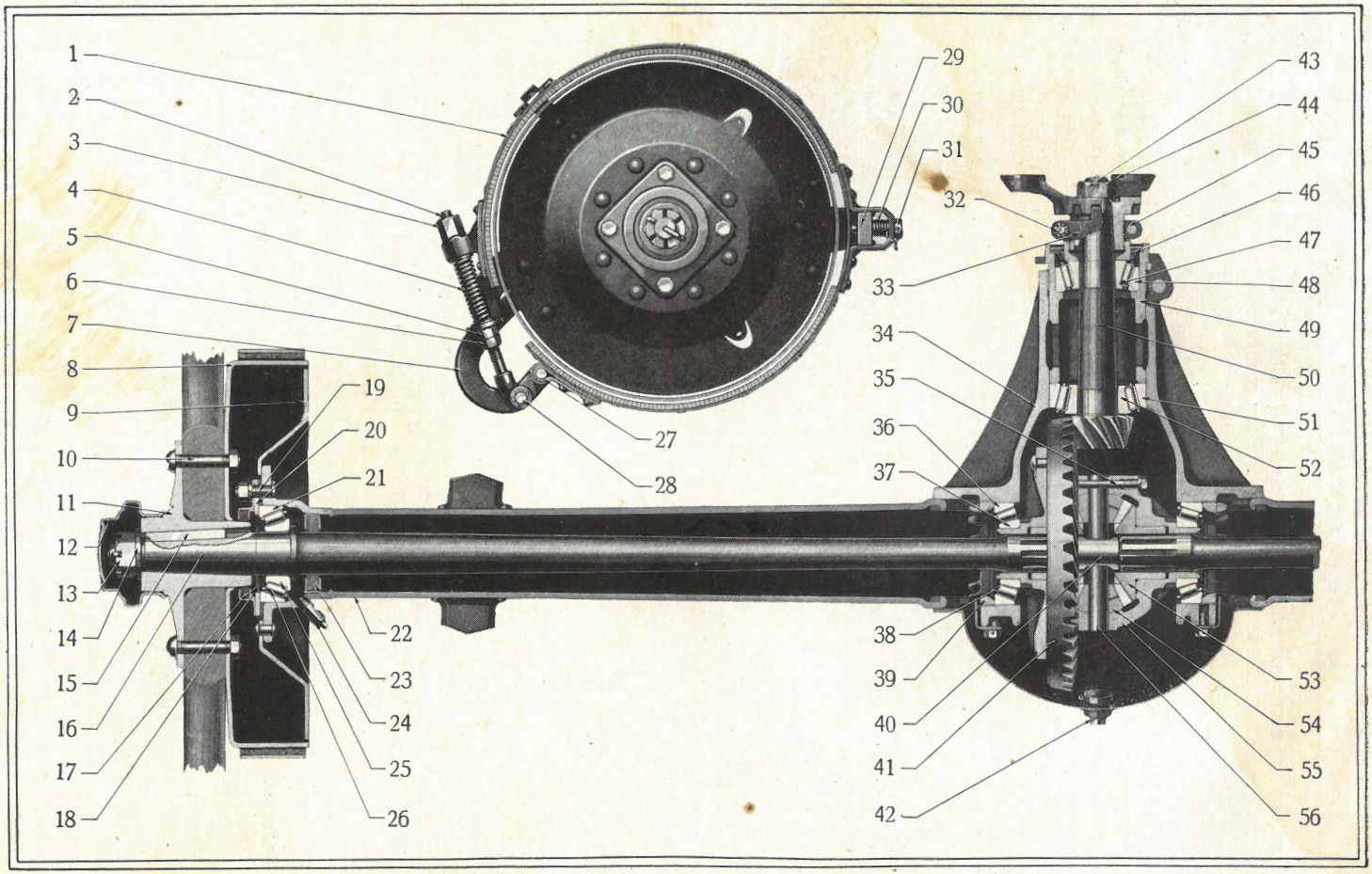


Fig. 16—Rear Axle—Two-Wheel Brakes

provided in the forward end of the bearing cage, which receive a tongued lock to prevent its turning. A clamping bolt clamps the forward end of the differential carrier tight around the pinion bearing cage and also holds the lock for the cage.

Pinion Bearing Adjustment

The rear flange of the rear universal joint is made with a thread on the outer surface of its hub. The adjusting nut for the pinion shaft bearings is assembled to the universal joint hub and clamped to its threads by means of two bolts. These bolts also hold a tongued lock in place which in turn prevents the adjusting nut from turning because of its tongue projecting into notches in the forward end of the universal joint hub. The rear face of the pinion bearing adjusting nut presses against the forward face of the front bearing inner race or cone and when the adjusting nut is turned to the right (clockwise) the rollers of the front and rear bearings are caused to fit tighter in their races. The pinion bearings should be adjusted to a snug running fit and then the adjusting nut backed off so as to allow a very slight end shake or play of the pinion shaft which should be about .001″ when pushed forward and backward by hand. A leather and steel oil seal assembly is fitted to the bearing adjusting nut which prevents leakage of oil from the forward end of the differential carrier.

Differential Bearing Adjustment

The differential bearings are assembled to the hubs of each side of the differential case and rest in suitable supports in the differential carrier. Caps over each of these bearings are held in place by means of cap screws which, in turn, are prevented from turning by wires passed through the heads of the cap screws. Bearing adjusting nuts are threaded into the bearing supports and caps which press against the outer ends of the bearing outer races. These adjusting nuts are made with notches into which the tongued ends of the adjusting nut locks are assembled, which prevent

Fig. 16—Rear Axle—Two-Wheel Brakes

1—Brake band assembly
2—Brake adjusting clevis
3—Adjusting nut, upper
4—Brake band return spring
5—Adjusting nut, lower
6—Lock nut
7—Brake lever
8—Brake drum
9—Brake support
10—Hub bolt
11—Hub
12—Hub cap
13—Axle shaft nut
14—Axle shaft nut washer
15—Axle shaft key
16—Axle shaft
17—Dust washer
18—Adjusting shim
19—Bearing retainer bolt
20—Bearing retainer plate
21—Bearing cup
22—Axle housing
23—Oil washer
24—Oil nipple
25—Bearing cone
26—Bearing roller
27—Brake band end pin
28—Clevis pin
29—Brake anchor bracket
30—Adjusting screw spring
31—Adjusting screw
32—Adjusting nut lock bolt
33—Bearing adjusting nut lock
34—Differential carrier
35—Differential pinion shaft lock screw
36—Differential bearing cup
37—Differential bearing cone
38—Differential bearing roller
39—Differential bearing adjuster
40—Axle shaft thrust spacer
41—Main drive gear
42—Oil level plug
43—Drive pinion nut
44—Universal joint spider
45—Bearing adjusting nut
46—Oil seal
47—Bearing cone
48—Bearing cup
49—Pinion adjusting cage
50—Drive pinion
51—Bearing cup
52—Bearing cone
53—Differential side gear
54—Differential pinion
55—Differential case
56—Differential pinion shaft

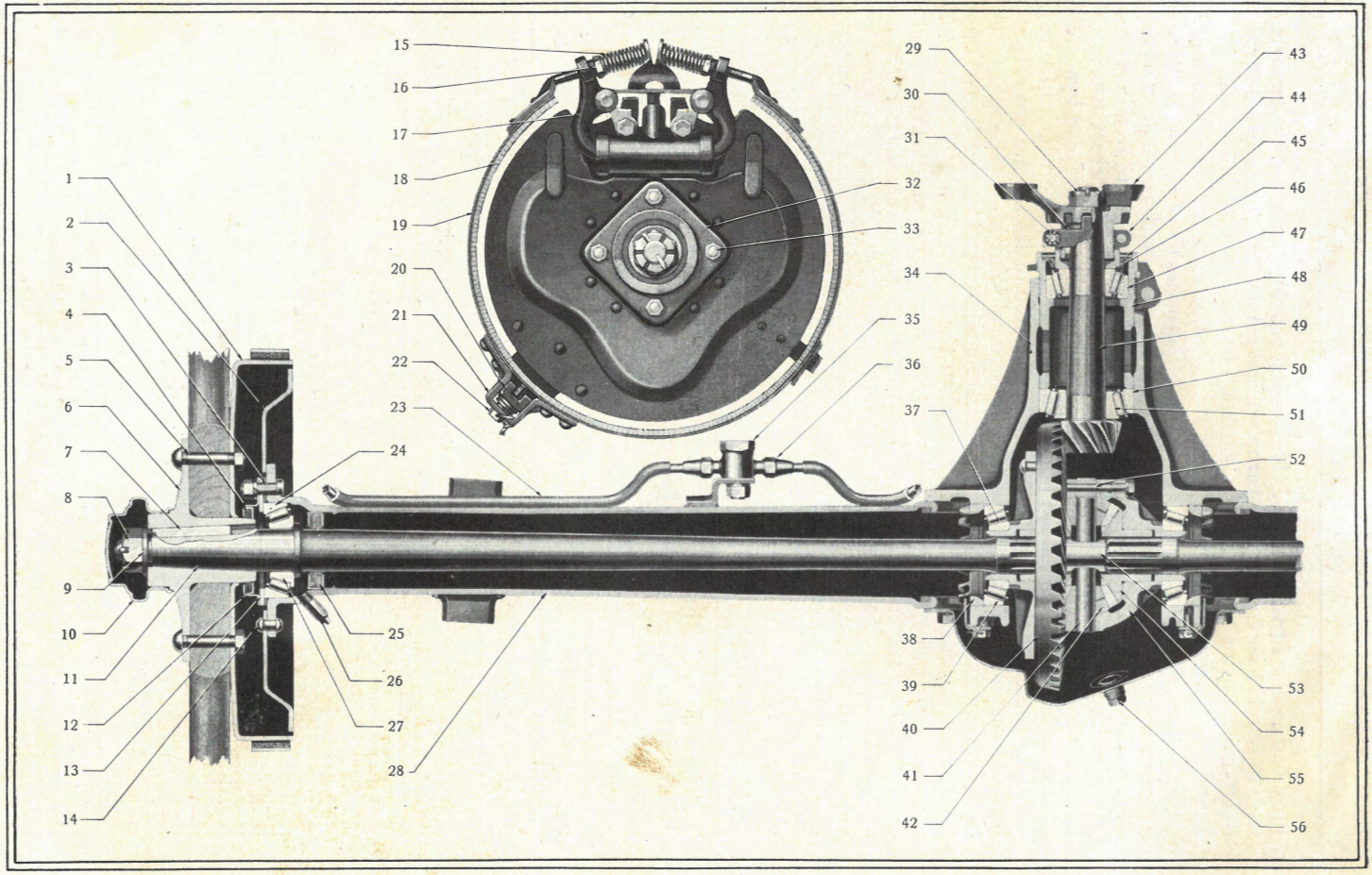


Fig. 17—Rear Axle—Hydraulic Four-Wheel Brakes

the adjusting nuts from turning. The locks are held in place on the bearing caps by cap screws which, in turn, are locked by wires passed through their heads.

Considerable care must be taken when adjustment of these bearings is being made so as to avoid changing the adjustment of the main drive gear and drive pinion. The best practice is to adjust both bearings exactly the same amount but when proper adjustment is once made it is seldom necessary to change it. However, if adjustment is ever necessary, the adjusting nuts should be turned so as to cause a slight drag in the bearing and then the adjusting nuts should be backed off one notch.

Axle Shaft Bearing Adjustment

The inner race of the axle shaft bearing is assembled from the hub end of the axle shaft and bears against a shoulder of the axle shaft. The outer race fits into the outer end of the axle housing and is held against the bearing rollers by a flat steel plate. Between the bearing retainer plate and the end of the axle housing are thin steel shims of varying thicknesses which are provided as a means for adjustment of the bearing. Two felt washers contained within steel shells are provided to prevent leakage of oil into the brake drum from the differential housing and the hub bearing. The felt washer assembly, which is pressed into the axle housing, only requires removal for replacement, but the felt washer assembly on the outer side of the bearing is removed, whenever adjustment is being made to an axle shaft bearing or removal of an axle shaft. The cap screws which hold the axle shaft bearing retainer plate also hold the outer felt washer assembly in place.

Between the inner ends of the axle shafts is a steel spacer which is free to move longitudinally according to the location of the axle shaft ends. The axle shaft bearings being forced against the shoulders on the axle shafts force the axle shafts toward each other and when the bearings are properly adjusted the steel spacer should have .004″ to .006″ end play.

Fig. 17—Rear Axle—Hydraulic Four-Wheel Brakes

1—Brake drum
2—Brake support
3—Bearing retainer bolt
4—Dust washer
5—Hub bolt
6—Hub
7—Axle shaft key
8—Axle shaft nut
9—Axle shaft nut washer
10—Hub cap
11—Axle shaft
12—Dust washer retainer
13—Adjusting shim
14—Brake support rivet
15—Brake band return spring
16—Brake band adjusting nut
17—Wheel cylinder brake lever
18—Brake lining
19—Brake band
20—Brake band anchor
21—Brake band anchor bracket
22—Brake band anchor adjusting screw
23—Brake fluid tube
24—Bearing cup
25—Oil washer
26—Oil nipple
27—Bearing cone
28—Axle housing
29—Drive pinion nut
30—Bearing adjusting nut lock
31—Adjusting nut lock bolt
32—Bearing retainer
33—Bearing retainer bolt
34—Differential carrier
35—Connection for flexible brake hose
36—Brake fluid tube union nut
37—Differential bearing cone
38—Differential bearing adjuster
39—Differential bearing cup
40—Main drive gear
41—Differential pinion shaft
42—Differential pinion
43—Universal joint spider
44—Bearing adjusting nut
45—Oil seal
46—Bearing cone
47—Bearing cup
48—Pinion adjusting cage
49—Drive pinion
50—Bearing cup
51—Bearing cone
52—Differential pinion shaft lock screw
53—Axle shaft thrust spacer
54—Differential side gear
55—Differential case
56—Oil level plug

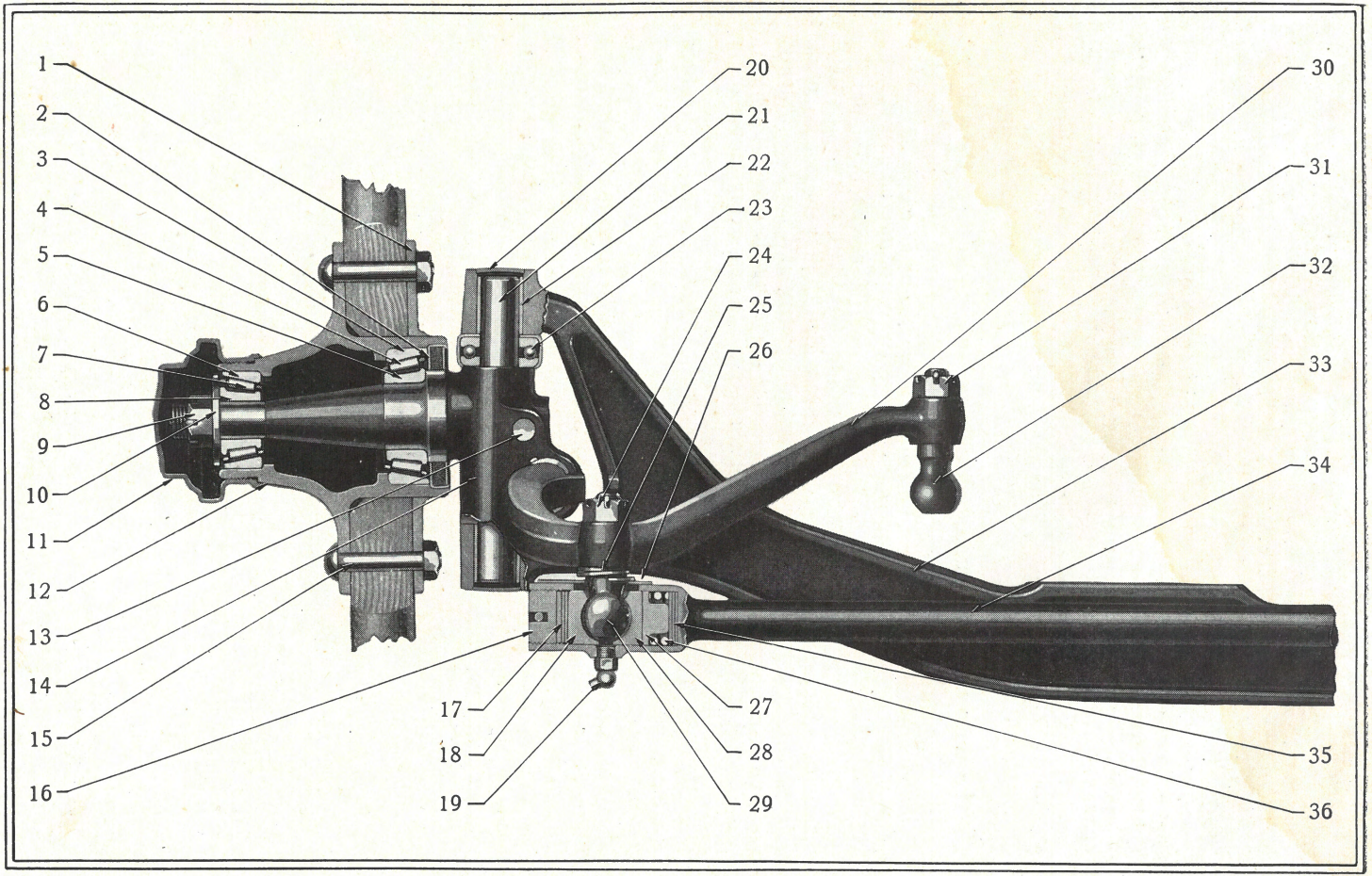


Fig. 18—Front Axle—Two-Wheel Brakes

Considerable care must be taken when adjustment of these bearings is being made to make certain that this amount of end play is allowed. If, after one bearing has been adjusted, it is found that the proper end play is not allowed for the spacer, the bearing on the opposite side of the car should be readjusted. Care should be taken to have the axle shafts extended equal distances from the ends of the axle housing. If they are not equalized, shims should be removed from the bearing on the end of the housing from which one axle shaft is extended the greater distance. The amount of shims to be removed is equal, in total thickness, to one-half of the inequality of the extended ends of the shafts. The shims which are removed should be installed on the opposite end of the axle housing. This procedure will centralize the axle shafts without changing the bearing roller adjustments.

To Remove Axle Shaft

The wheel should be removed from the axle shaft first and then the bolts which hold in place the axle shaft bearing retainer plate. The bearing retainer plate, shims, and outer felt washer assembly should then be removed from the housing and shaft, using care to keep the shims clean and intact so that when they are reassembled the same bearing adjustment will be obtained. The axle shaft can then be withdrawn from the axle housing. If the outer race of the bearing binds too tightly in the axle housing to withdraw the assembly by hand, a suitable puller should be used on the axle shaft so as to avoid damage to the bearing races and rollers.

Lubrication

The differential and pinion bearing, as well as all axle gears, should be lubricated with a high-grade fluid gear lubricant. In winter, in very cold climates, where the atmospheric temperature is below 0° Fahrenheit, this should be thinned with one-half pint of colorless kerosene. The lubricant should be poured into the differential housing through the filler hole in the rear of the cover. This hole is located so as to serve as a guide in determining the proper amount of lubricant to be put into the housing. Lubricant should be level with the bottom of this hole. (Page 18.)

The axle shaft bearings should be lubricated with a high-grade fluid gear lubricant every 5000 miles by means of the high-pressure lubricant gun.

Fig. 18—Front Axle—Two-Wheel Brakes

1—Hub flange
2—Dust washer
3—Bearing cup
4—Bearing roller
5—Bearing cone
6—Bearing cup
7—Bearing roller
8—Bearing cone
9—Steering knuckle nut
10—Bearing washer
11—Hub cap
12—Hub
13—King pin lock pin
14—Steering knuckle
15—Hub bolt
16—Tie rod plug
17—Spacers
18—Ball seat
19—Oil nipple
20—Oil seal plug
21—King pin
22—King pin bushing
23—Steering knuckle thrust bearing
24—Tie rod ball nut
25—Dust cover spring
26—Dust cover
27—Tie rod spring seat
28—Ball seat
29—Tie rod ball
30—Steering arm
31—Drag link ball nut
32—Drag link ball
33—Front axle I-beam assembly
34—Tie rod
35—Spacers
36—Tie rod spring

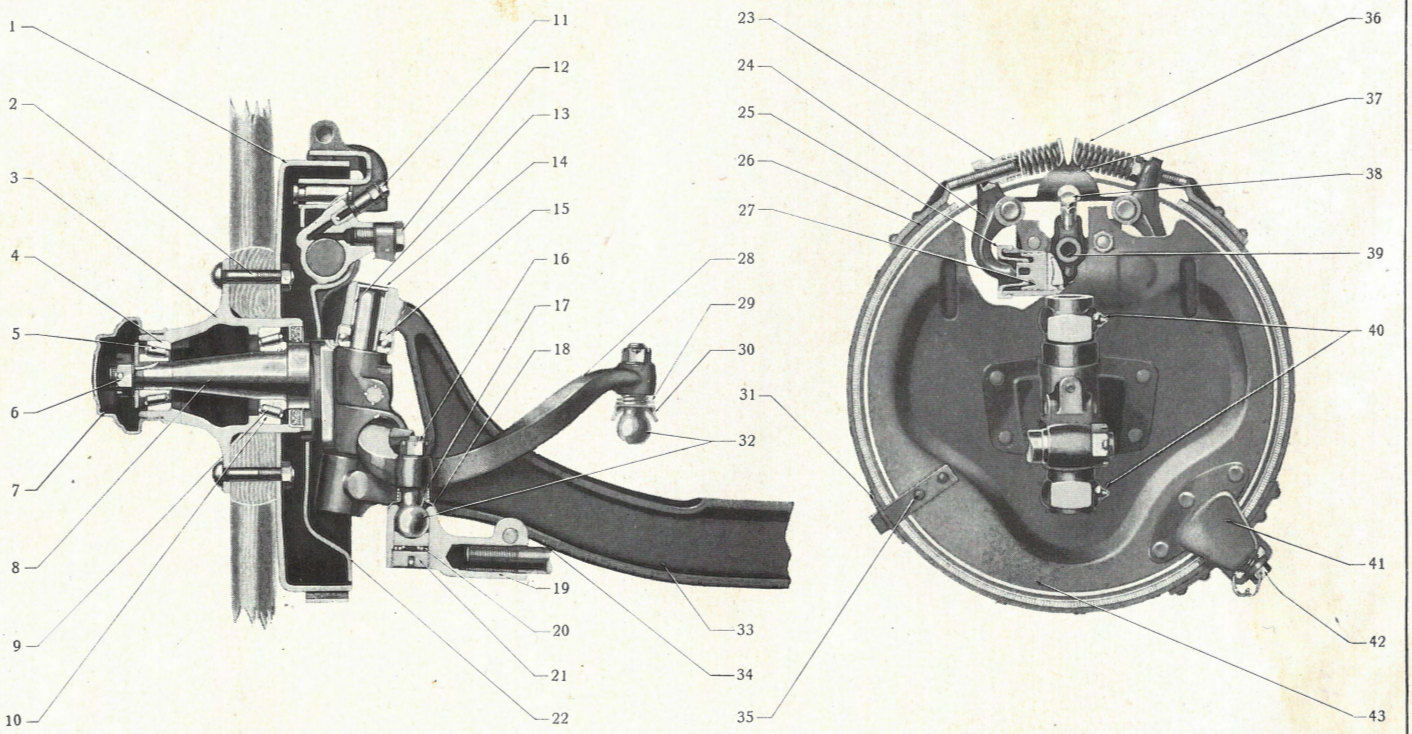


Fig. 19—Front Axle—Hydraulic Four-Wheel Brakes

Front Axle

The front axle center is a heavy steel forging of I section, with spring saddles and yokes forged integral; the steering arms and steering knuckles are heavy drop forgings.

It is of vital importance in the safe operation of a motor car that the front axle tie rod and wheels be kept well lubricated and properly adjusted. They should be inspected regularly as designated on Pages 18 and 54.

Front Wheel Alignment and Tie Rod Adjustment

Correct alignment of front wheels must be maintained to assure continuous, easy steering and long tire mileage. The wheel bearings should be properly adjusted and tire pressures equal before taking measurements. (Page 54.) The distance between the wheels when measured in front at the felloe, approximately 9 inches above the floor, and in rear from the same points should be equal or not greater at the rear than $\frac{1}{8}$ inch. Measurements should be taken in front, the felloe marked, and the car moved forward just far enough to measure from exactly the same points on the felloe bands in the rear, and at the same height from the floor. It is important to follow these instructions to get an accurate setting.

Front wheel alignment or "toe-in" is controlled by the distance between the center of the balls on the steering knuckle arms. These balls project downward into enlarged ends of the tie rod and on each side of the two steel balls are steel ball seats. Steel plugs are threaded into the outer ends of the tie rod and force steel spacers against the outer ball seats. Similar steel spacers are placed at the inner ends of the enlarged ends of the tie rod. Between these spacers and the inner ball seats are cup-shaped spring seats and springs. If it should ever be necessary to increase the distance between the wheels at the rear side so as to allow more "toe-in", one or more spacers should be removed from the outer ends of the tie rod and installed at the inner end of the enlarged ends. If "toe-in" is to be decreased, spacers should be removed from the inner end of the enlarged ends of the tie rod and installed at the outer ends, which is just the reverse of the above operation.

It, of course, is necessary to disassemble the parts in the ends of the tie rod in order to transfer the spacers but this is easily accomplished by re-

Fig. 19—Front Axle—Hydraulic Four-Wheel Brakes

1—Brake drum
2—Hub bolt
3—Hub
4—Bearing cup
5—Bearing cone
6—Steering knuckle nut
7—Hub cap
8—Steering knuckle
9—Bearing cone
10—Bearing cup
11—Bleeder screw
12—Brake hose connection cap screw
13—King pin bushing
14—King pin dust cover
15—Steering knuckle thrust bearing
16—Tie rod ball nut
17—Dust cover spring
18—Dust cover
19—Tie rod end
20—Tie rod bearing spring
21—Tie rod end plug
22—Brake support
23—Brake band adjusting nut
24—Wheel cylinder brake lever
25—Wheel cylinder cap
26—Brake band
27—Wheel cylinder piston
28—Steering knuckle arm
29—Drag link ball dust cover spring
30—Drag link ball dust cover
31—Brake band guide bracket
32—Tie rod and drag link balls
33—Front axle "I" beam (bed)
34—Tie rod
35—Brake guide clip rivet
36—Brake band return spring
37—Brake lever support
38—Bleeder cap screw
39—Wheel cylinder
40—Oil nipples
41—Brake band anchor
42—Anchor adjusting screw
43—Brake support

moval of the cotter pins and threaded plugs in the ends of the tie rod. While the parts are disassembled it is advisable to thoroughly clean them before they are reassembled so as to facilitate proper adjustment of the threaded plugs. The plugs should then be turned into the tie rod by means of a large screwdriver until they strike solid seats which will compress the heavy springs between the spring seats and the inner sets of spacers. The spring seats should then be tight against the spacers. Then the threaded plugs should be turned back one full turn which will provide space between the spring seats and spacers. The cotter pins should next be installed in the tie rod ends so as to lock the threaded plugs in place.

Lubrication

The lubricant nipples in the tie rod ends face toward the rear of the car and should receive a high-grade fluid gear lubricant from the high-pressure lubricant gun every 500 miles.

The king pins should be lubricated every 500 miles with a high-grade fluid gear lubricant by means of the high-pressure lubricant gun and the nipples provided in the side of the axle yokes toward the front of the car.

Wheels

Each front wheel is supported by two roller bearings, and adjustable. The adjustment is made by first jacking up the axle until one wheel just clears the floor. The hub cap should then be removed as well as the spindle nut cotter pin. The wheel should then be spun slowly and the spindle nut turned tighter only until the bearings begin to bind slightly; then the nut should be backed off one notch. The cotter pin and hub cap should then be reinstalled. A two-ounce weight, at any one of the rim clamp nuts, should bring that part to a stop at the bottom of the wheel, The front wheel bearings must be free and have very slight end shake. The wheel bearings should be cleaned and packed with a medium cup grease which will not harden at low temperatures every 5000 miles.

IMPORTANT: It is of vital importance that the front wheels (complete with tires) be as near perfectly balanced at all times as is possible in order to avoid so-called "tramping" of front wheels at high speeds. The rapid revolutions of the wheels develop gyroscopic forces, which, combined with unbalanced wheel forces, will cause severe wobble and bounding motion of the front wheels. These forces reverse their direction very rapidly, and, because of this fact, heavy strains are developed in the steering mechanism. For similar reasons it is equally important to maintain uniform tire pressures. Unequal and low pressure in the two front tires will cause much annoyance when driving at high speeds.

The same condition is true with the rear wheels, but the strains are transmitted to the axle shafts and their bearings, but are not so apparent. Excessive tire wear also results from poorly balanced wheels when driven at high speeds.

Tire Pressures

To insure smooth and steady steering operation at all speeds, the air pressure in both front tires should be exactly 40 pounds as measured with an accurate gauge for balloon tires and checked at least once each week. The air pressure in the rear tires should be 35 pounds.

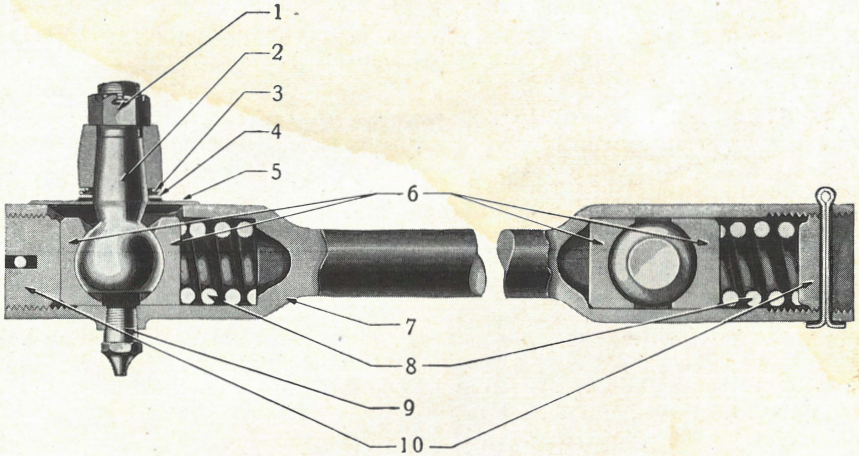


Fig. 20—Drag Link

1—Steering knuckle drag link ball nut
2—Steering knuckle drag link ball
3—Dust cover spring
4—Dust cover washer
5—Dust cover
6—Drag link ball seats
7—Drag link body
8—Ball seat springs
9—Oil nipple
10—Drag link end plugs

Drag Link

The drag link (Fig. 20) connects the steering gear with the front axle. In each end of the drag link are two heavy springs for cushioning the road shocks of the front wheels which otherwise would be transmitted to the steering gear. The springs are adjusted by means of round slotted plugs threaded into each end of the drag link. Cotter pins are inserted through the ends of the drag link, and slots in the outer ends of the round plugs, to prevent the plugs changing their adjustment.

When adjustment is being made of the drag link bearings and springs, all of the parts should be cleaned and oiled as well as the adjusting plugs and threads inside of the drag link tube. Standard springs should be used to replace any that do not measure from $\frac{31}{32}$" to $1\frac{1}{32}$" free length. Any other worn parts should be replaced. When the parts are being assembled the adjusting plugs should be screwed "in" until the springs are compressed solid, then the plugs should be unscrewed two or two and one-half turns. A large screwdriver should be used for adjusting the plugs so as to overcome any binding in the threads. When the plugs are adjusted properly the position of their outside faces should be flush with the ends of the drag link or slightly "in", *but must not protrude.*

The steering arm balls of the front axle and the steering gear arm in the drag link ends should be lubricated with a high-grade fluid gear lubricant through the lubricant nipples at intervals of every 500 miles.

Springs

The chassis springs are attached to the frame by means of hardened and ground steel bolts passed through bronze bushings in the spring eyes and hangers.

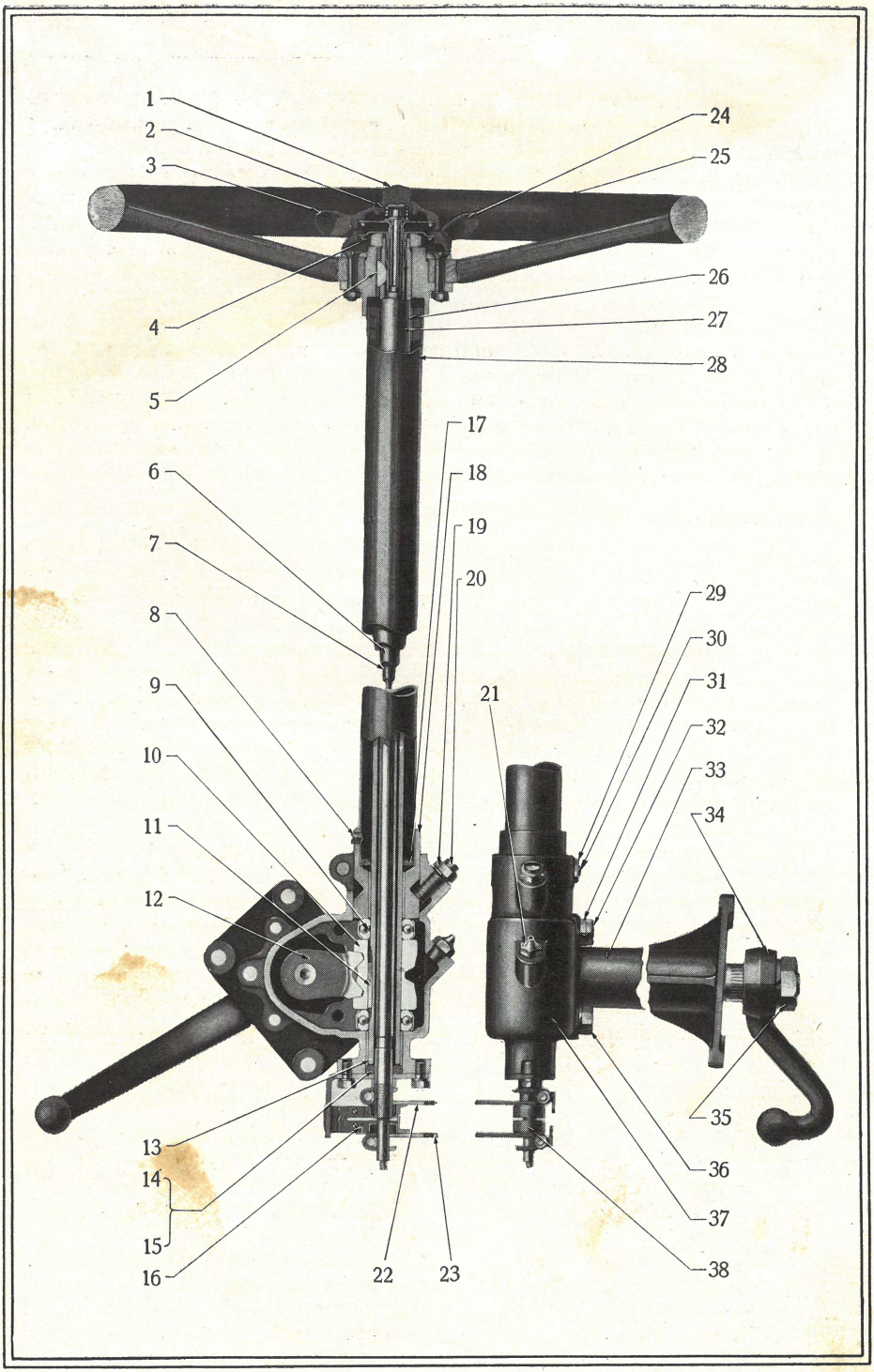


Fig. 21—Steering Gear

The spring shackle bolts must be adjusted so as to not cause the shackles to bind on the sides of the springs. They should be drawn tight and backed off one-half turn, then locked by the nuts on the ends of the bolts.

Spring breakage at or near the center is caused, in practically every instance, by loose spring clips (holding the springs to the axles), which throw the entire stress on the center tie bolts. The nuts on the spring clips should be tightened at least three times during the first month and about once every month for the succeeding six months.

Steering Gear

The steering gear is of the semi-irreversible worm and sector type; the angle of the worm is great enough to allow the front wheels to follow slight deviations in the road, but does not permit jerking or turning of the wheels. There are three points of adjustment for excessive backlash of the steering wheel, namely: end play of worm thrust bearings, end play of sector shaft, and mesh of worm and sector teeth.

Adjustments

The worm thrust bearings are adjusted by means of the adjusting screw, No. 20, Fig. 21. The inner end of this screw presses against a beveled surface on the housing adjusting nut and, when turned in a clockwise direction, end play is reduced or eliminated. Before making this adjustment the bolts which clamp the steering column bracket (on instrument board) to the steering column should be loosened so as to permit movement of the column jacket, which is held to the housing adjusting nut by means of the set screw, No. 8, also the housing. Care must be taken when this adjustment is being made to not bind the bearings, which will cause rapid wear and stiff action of the steering gear. The clamping bolts and lock nuts should be securely tightened as soon as this adjustment has been completed.

Lost motion between the teeth of the sector and the worm is adjusted by movement of the housing cover assembly which is accomplished by rotating the housing cover adjusting sleeve, No. 31, the head of which is between the housing and the head of one of the four cap screws which hold the housing cover in place. However, before making this adjustment the nuts on the bolts holding the steering gear to the frame should be loosened and then the four cap screws on the housing cover should be

Fig. 21—Steering Gear

1—Horn button
2—Horn button spring
3—Spark control lever
4—Steering wheel nut
5—Steering wheel key
6—Throttle tube
7—Spark tube
8—Column jacket set screw
9—Worm thrust bearing
10—Steering worm
11—Steering worm key
12—Worm wheel (sector)
13—Housing lower bushing
14—Housing oil seal
15—Housing oil seal washer
16—Friction band clamp screw
17—Adjusting nut felt washer
18—Adjusting nut
19—Adjusting nut adjusting screw lock nut
20—Adjusting nut adjusting screw
21—Oil nipple
22—Throttle control lower lever
23—Spark control lower lever
24—Throttle control lever
25—Steering wheel
26—Column jacket bushing
27—Steering tube
28—Column jacket
29—Clamp bolt nut
30—Clamp bolt
31—Housing eccentric adjusting sleeve
32—Housing eccentric adjusting sleeve screw
33—Housing bracket
34—Steering arm
35—Steering arm nut
36—Housing bracket screw
37—Housing
38—Throttle and spark lever friction band

loosened about one-quarter turn. The adjusting sleeve, No. 31, should then be turned clockwise (to remove lost motion) one-quarter turn. This adjustment should only be made when the steering gear is set in the mid-position because the worm is machined so as to cause a tighter mesh of the sector teeth and worm when set in that position. If adjustment is not made at mid-position, steering action may be stiff when driving the car straight ahead. Slightly greater backlash will be observed when the steering gear is turned to extreme right or left. After this adjustment is completed the four housing cover cap screws should be tightened as well as the nuts on the bolts holding the steering gear to the frame.

Adjustment of end play in the sector shaft is accomplished by loosening the lock nut on the adjusting screw and turning the latter to the right or left as required. This adjustment point is located on the outside of the steering gear body toward the engine and directly opposite the inner end of the sector shaft.

If it should ever be necessary to change the amount of friction in the spark and throttle control mechanism this may be accomplished by turning the screws, No. 16, at the bottom of the steering gear. Turning either of these screws in a clockwise direction tightens a friction band on the adjacent control lever. The upper screw adjusts the friction for the throttle control lever and the lower screw adjusts for the spark control lever.

Lubrication

A special heavy steering gear lubricant should be used for the steering gear. This lubricant should be diluted with engine oil, if necessary, in extremely low temperatures. The housing should be filled with this lubricant by means of the high-pressure gun through the nipple in the top of the housing at intervals of each 5000 miles.

Brakes—Two-Wheel

The two-wheel foot brakes are of the external contracting type mounted on each end of the rear axle housing and operate on drums bolted to each of the rear wheels. The emergency brake, operated by the hand lever, is also of the external contracting type but is mounted on the rear of the transmission case and operates on a single drum bolted to the front universal joint. Care should always be taken to keep grease or oil off the surface of the brake band linings because of the resulting loss of friction which would render the brakes practically useless.

Adjustment of Foot Brakes—Two-Wheel

When adjustment is to be made to the foot brakes, both rear wheels should be raised off the floor and the locking wire removed from the heads of the adjusting screws located at the rear of each band and shown in Fig. 22. The adjustment is accomplished by first turning the adjusting screw, No. "12", clockwise until the space at the points "10" and "11", between the brake lining and the drum, is $\frac{1}{32}$ of an inch. The adjusting nut, No. "2", should next be turned, after loosening the lock nut, No. "3", until the space between the lining and drum, at the point "7", is $\frac{1}{32}$ of an inch. After this adjustment has been completed the upper half of the brake band should be adjusted to the same amount of clearance by turning

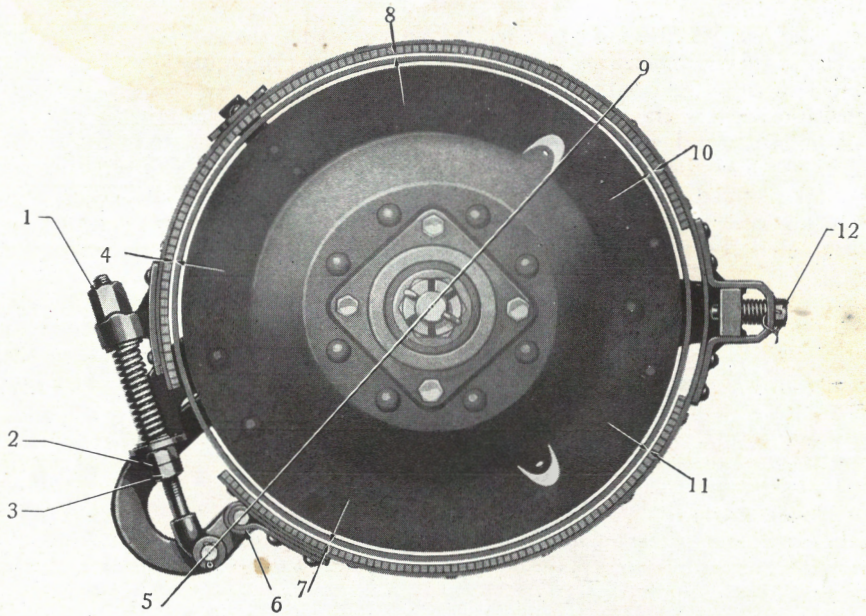


Fig. 22—Wheel Brake Band Adjustment—Two-Wheel

1—Adjusting nut (upper)
2—Adjusting nut (lower)
3—Lock nut
4—$\frac{1}{32}$" clearance
5-9—Center line
6—Brake band end pin
7—$\frac{1}{32}$" clearance
8—$\frac{1}{32}$" clearance
9-5—Center line
10—$\frac{1}{32}$" clearance
11—$\frac{1}{32}$" clearance
12—Anchor screw

the adjusting nut No. "1". Both brake bands should be adjusted in the same manner and with the same clearance at the drums (points 7-11-10-8-4).

After adjustments have been completed the locking wire should be inserted in the heads of the adjusting screws, No. 12, so as to prevent them from turning and changing the adjustment.

In order to maintain proper wrapping action of the brake bands the center of the brake band end pin should be even with a line drawn through the centers of the pin in the adjusting rod and the axle shaft as shown by the line 5-9 in Fig. 22.

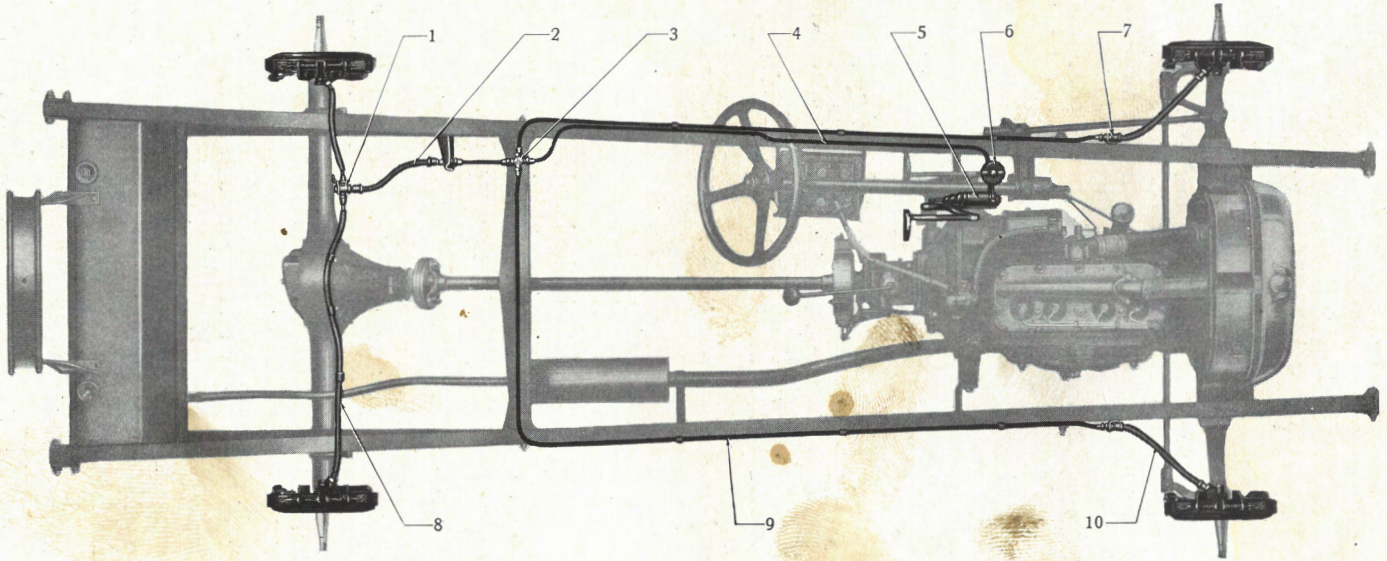


Fig. 23—Hydraulic Four-Wheel Brake System

Chrysler Hydraulic Four-Wheel Brakes

The Chrysler Lockheed hydraulic four-wheel brakes are self-equalizing and their adjustment is easy. There are no operating rods or cross shafts, and, consequently, nothing to rattle and no joints to lubricate. Simple in construction, the brakes depend only upon the fundamental displacement principle of hydraulics for their operation and equalization, and when treated with a reasonable amount of consideration will need but little attention.

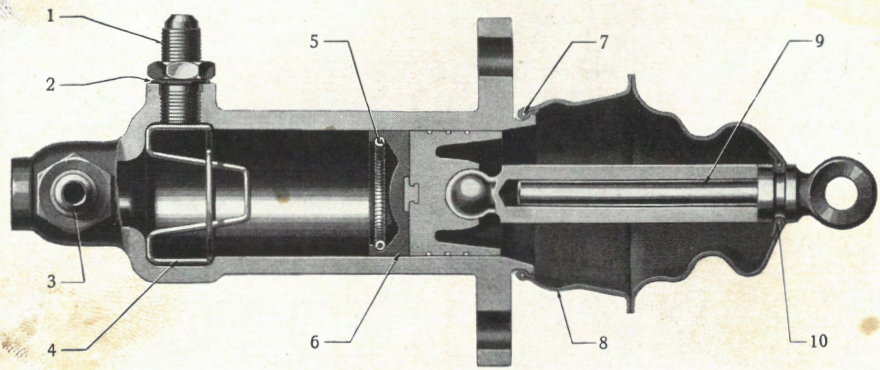


Fig. 24—Master Cylinder

1—Brake fluid inlet connection
2—Gasket
3—Brake fluid outlet connection
4—Piston stop
5—Piston cup expander
6—Piston cup
7—Boot retainer ring (large)
8—Boot
9—Piston rod assembly
10—Boot retainer ring (small)

Operation—Hydraulic Four-Wheel

Connected to the brake pedal is a piston working in a master cylinder, which is bolted to the left hand side of the flywheel housing. Leading from this master cylinder to cylinders at each of the four brake drums are metal tubes and heavy non-expanding hose. In each wheel cylinder are two pistons, each of which is connected through a lever with an end of the brake band. The whole system (that is, all cylinders and lines) is full of liquid, all air having been expelled in the process of filling. There is no pressure in the system when the brakes are not in operation and the brake band linings are held clear of the drums by the brake return springs.

When the brake pedal is depressed, the piston in the master cylinder moves forward, expelling into the lines sufficient liquid to force out the

Fig. 23—Hydraulic Four-Wheel Brake System

1—Rear axle brake tube tee connection
2—Brake liquid flexible hose
3—Four-way brake tube frame connection
4—Brake tube from master cylinder
5—Master cylinder
6—Brake liquid supply tank
7—Brake hose frame connection
8—Rear axle brake tube
9—Frame tube to hose
10—Brake liquid flexible hose

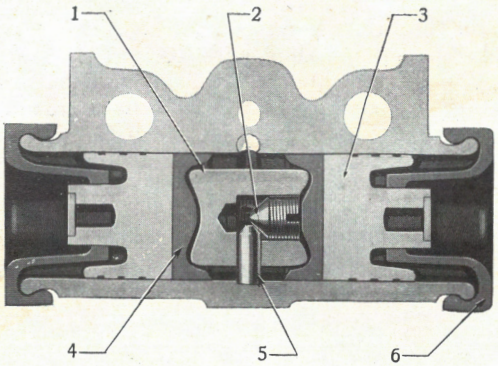


Fig. 25—Wheel Cylinder

1—Piston cup stop
2—Piston cup stop pin screw
3—Piston
4—Piston cup
5—Piston cup stop pin
6—Boot

pistons in each of the brake drum cylinders until the brake bands come in contact with the drums.

There can be no braking pressure applied to any one drum until all bands are in contact with their drums. The greater force required to give braking pressure cannot be supplied until the resistance in all wheel cylinders is built up to that force. This is governed by the physical law that force or pressure exerted upon a column of liquid is expended equally in all directions. With the four brake bands at the point of braking, the additional pressure of the foot pedal is naturally transmitted equally to all brakes, giving a positive braking action, absolutely self-equalizing in its application.

When the brake pedal is released, the pistons in the wheel cylinders are returned to their stops by the brake return springs, forcing the liquid, used in displacing the pistons, through the lines back into the master cylinder.

General—Hydraulic Four-Wheel

The supply tank on the dash should always be not less than one-half full of the genuine Chrysler Hydraulic Brake Liquid, which is obtainable at any Chrysler Service Station. This should be used to the exclusion of all other liquids, but if for any reason the genuine liquid is not available for an immediate requirement a suitable liquid may be made by thoroughly mixing equal parts of medicinal castor oil and No. 5 denatured alcohol free from acid (wood alcohol should never be used). This formula should only be used when the genuine Chrysler Hydraulic Brake Liquid is not available and it is important that the improvised liquid be entirely drained from the system as soon as possible. Chrysler Hydraulic Brake Liquid is made in very much the same manner, but certain chemicals are added by a very lengthy, as well as difficult, process which neutralizes acids found in the formula prescribed above.

The total capacity of the system is 1¼ pints. The pump handle on the supply tank should be in the locked position, which is accomplished by pushing the handle down to the limit of its travel and turning to the right until positively seated.

The anchors on the brake bands should be oiled every 2000 miles and their action checked to see that they work freely. There are no other points in the hydraulic brake operating mechanism requiring lubrication.

The foot pedal is set for clearance between the pedal and the floor board, on each individual car, at the factory. Readjustment in the field will not be necessary and improper adjustment will result in decreasing the effective travel of the master cylinder piston.

To Adjust Four-Wheel Brakes

The brake bands should conform to the brake drum; that is, they should form a circle. With the foot pedal in the released position, the bands should be adjusted with .010″ to .015″ clearance between brake band and drum at all points. This adjustment is made through the hexagon nuts on the threaded ends of the brake bands and a screw at the anchor plate. The clearance can best be established by use of a .010″ feeler, which should slip between band and drum at any point without binding. To avoid excessive

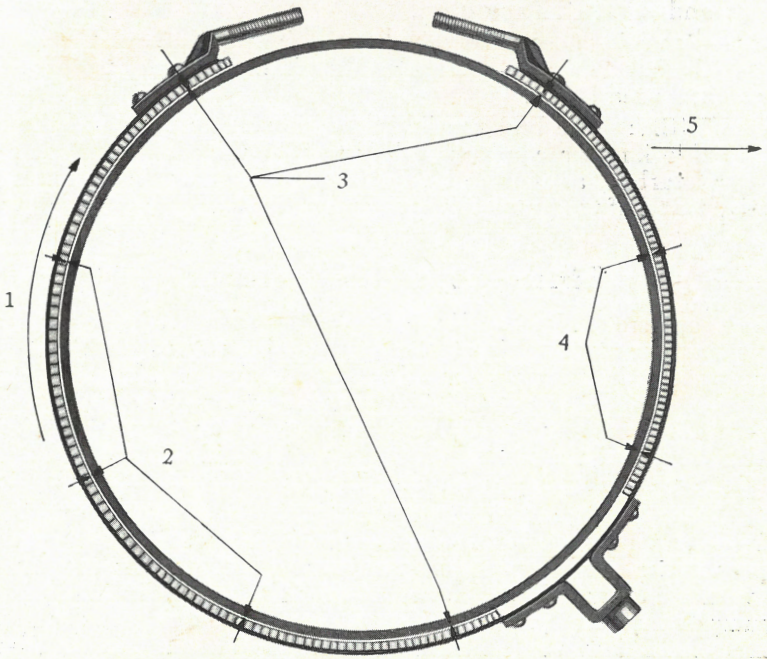


Fig. 26—Wheel Brake Band Adjustment—Four-Wheel

1—Direction of drum rotation
2—.015″ clearance
3—.010″ clearance
4—.015″ clearance
5—Direction of car travel

take-up at the brake band ends, clearance should not be greater than .015″. The brake band brackets at the anchor pins should move in and out freely.

Loss of liquid, air in the lines due to broken connections or a leaking or unlocked supply tank valve are the only causes for any change in the effective movement of the brake pedal, which can easily be detected by a

free movement of the brake pedal before feeling resistance in the master cylinder.

When this looseness becomes appreciable, that is, ¾" of pedal movement, it should be corrected as follows: With the brake bands releasing fully and foot pressure released from the foot pedal, the pump handle on the supply tank should be released by turning to the left until it is free to move up and down. The pump handle should then be given a few strokes up and down until the foot pedal no longer has free movement. After this has been done, a pause of several seconds should be made to permit excess liquid in the lines to back up into the supply tank, and then the valve closed at the bottom of the pump by depressing the pump handle and turning to the right until firmly seated. It is important that the pump handle be locked tight so that no liquid can be returned to the tank under pedal pressure.

If after pumping the system full of liquid, it is found that the brake bands do not grip the drums properly, the band adjustments should be checked and corrected if necessary.

If the foregoing does not eliminate excessive pedal travel, the condition can only be due to air in the lines and it will be necessary to "bleed" the lines as indicated below.

CAUTION: The brake pedal stop screw adjustment and the brake piston rod lock nuts are properly adjusted when the car is built and should not be disturbed, as improper adjustment will result in decreasing the effective travel of the piston in the master cylinder.

Bleeding the Lines—Four-Wheel Brakes

The cap screw, No. 11 (Fig. 19), should be removed and the bleeder nipple and hose attached (part of car tool equipment) to the bleeder valve in the wheel cylinder with a small open end wrench. The bleeder valve should be opened from ½ to ¾ of a turn, but not completely removed. One end of the rubber tubing should be slipped over the exposed end of the bleeder valve and the other end of the tubing laid into a clean and dry container, preferably a pint bottle. The latter should be resting on the floor.

With foot pressure removed from the brake pedal, the valve in the supply tank should be opened by turning the handle to the left until it is free to move up and down. By means of this handle, liquid should then be pumped into the system, which will force the liquid out of the brake drum cylinder into the container. When the lines are being filled, by pumping, the cap at the top of the tank should be released at least one turn to insure proper venting. The cap should then be tightened with fingers only and NOT WITH A TOOL. After about ½ pint of liquid has been drained from the system and it is observed that air bubbles still remain in the liquid, coming out of the rubber tubing, the bleeder valve should be closed and the cap removed from the supply tank. The liquid drawn from the system should then be poured back into the supply tank. This operation should be repeated until no more bubbles appear. It may be necessary to apply this operation to all four brake drum cylinders to insure air being removed from all lines.

It will be necessary to bleed the lines to remove air from the system after disconnecting one of the brake drum cylinders for removal of axle parts, or if a connection or pipe should break.

Leaks—Four-Wheel Brakes

An excessive consumption of liquid denotes a leak in the system. This can easily be detected by applying very heavy pressure to the brake pedal while the car is standing still and then checking over the various connections to see the point of leakage.

Liquid Expansion—Four-Wheel Brakes

In exceptionally hot weather, a slight brake drag may be noticed. This is due to either too much liquid having been pumped into the system or expansion of the liquid under heat. The correction is to open the supply tank valve for a few seconds. Care must be taken not to press on the foot pedal while this valve is open. After the valve has stood open for a few seconds, it should again be closed.

CAUTION: Pistons or any other parts of the master cylinder or brake drum cylinders should never be removed. Special tools are required to correctly assemble these parts. There is nothing in these cylinders to give trouble, but, if it should be necessary to make a service repair, a complete cylinder assembly should be used.

Relining Brakes

When brakes are being relined, it is imperative that the same kind of material be used on all brakes, because if different materials are used the brakes on the individual wheels will not be equally effective in their action.

In case of relining one brake only, the same material should be used as is on the other bands. There may be a slightly less effective action when first installed, but this will be self-corrected as the face of the lining comes to a bearing with use.

The brake lining on Chrysler brakes was developed as a result of very intensive research, and, for most satisfactory brake operation, relining should only be done with genuine Chrysler brake lining purchased from a Chrysler Service Station and soft tubular rivets used with their heads $\frac{1}{16}$" below the outer surface of the lining.

After relining, the bands should be very carefully shaped to the drum. The brake bands may be adjusted by means of the nuts on their ends at the upper side of the drum. The diagram on Page 63 indicates the proper clearance between the band and the drum at the different points.

After the brake bands have been adjusted properly, the car should be driven about one mile for "wearing in" the uneven surface. During this mile of driving the brakes should be applied about ten times with sufficient pressure to stop the car normally from a speed of about twenty miles per hour. Then the adjustment should be checked to make certain that it is according to the illustration (Fig. 22 or 26). Under no circumstances should the lining be "burned in". This not only blisters the finish on the drums and bands, but it reduces the frictional qualities of the lining.

Emergency Brake

The emergency brake is of the external contracting band type, hand-controlled, and operates on a drum mounted on the front flange of the front universal joint.

Adjustment is made after first raising the rear wheels off the floor and setting the brake hand lever in the extreme forward position. Then the anchor adjusting screw, No. 4 (Fig. 27), should be turned so as to give $\frac{1}{16}$" clearance between the drum and the lining. The guide bolt, No. 18, should next be turned so as to give $\frac{1}{16}$" clearance throughout the remainder of the lower half of the band and drum. The guide bolt lock nuts, No. 14, should be tightened after this adjustment has been made and then the adjusting nut, No. 16, should be turned so as to give $\frac{1}{16}$" clearance between the upper half of the band and drum. The band should conform to the drum at all points.

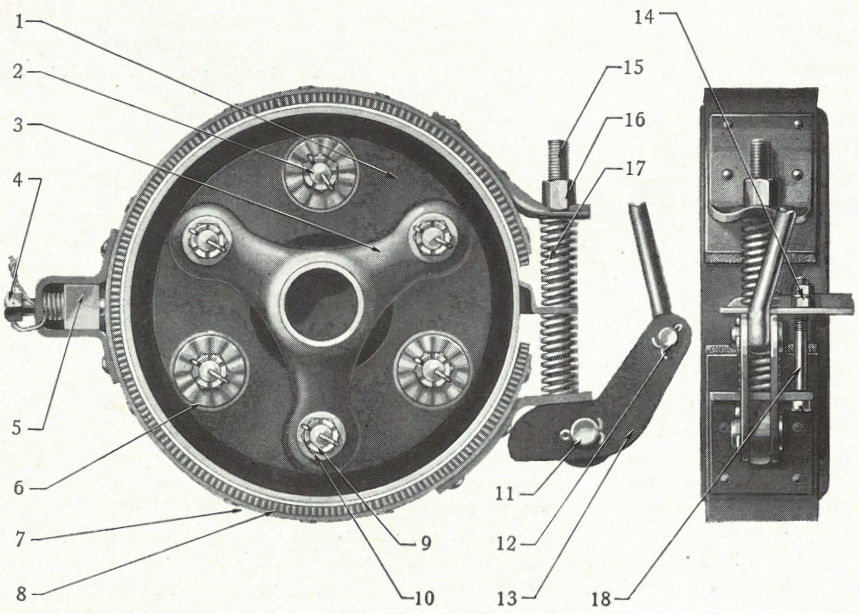


Fig. 27—Emergency Brake

1—Universal joint disc
2—Transmission shaft spider bolt
3—Spider (propeller shaft end)
4—Anchor adjusting screw
5—Brake support
6—Universal joint disc buckle plate
7—Brake band assembly
8—Brake band lining
9—Propeller shaft spider bolt
10—Nut
11—Clevis pin
12—Clevis pin
13—Operating lever
14—Guide bolt nut
15—Adjusting bolt
16—Adjusting bolt nut
17—Spring
18—Guide bolt

Corrective Measures

No adjustments should be made nor any parts tampered with until the cause of the trouble is known. Otherwise adjustments which are properly made may be destroyed. The problem should be analyzed.

Engine Fails to Start

1. Lack of fuel.
   Fuel line should be free of obstructions.
2. Lack of ignition current.
   May be due to failure to turn the switch or to a broken or disconnected wire. Ammeter needle will move when ignition current flows through breaker points.
3. Fouled spark plugs.
   Due to an excessive amount of oil in the engine and too long use, whereby the points become coated with carbon. Fouled spark plugs should be removed and cleaned or replaced with new.
4. Points improperly set. (No. 3 under "Engine Misses".)
5. The carburetor choke valve must be closed tightly.

Engine Stops

1. Lack of fuel.
2. Disconnected wires.
3. Lack of oil.
4. Carburetor flooding.

Engine Misses

1. Broken or disconnected wiring.
2. Fouled spark plugs.
   The spark plugs should be short-circuited one after another by touching a hammer or screwdriver from the metal of the cylinders to the terminals of the spark plugs. When one is reached which makes no difference in the running of the engine, this is probably the plug at fault.
   Remove and clean. Porcelain insulation may be cracked.
3. Points of spark plugs improperly set.
   Points too close together or too far apart may cause missing. Spark plug points should be set .027″ apart.
   Accumulation of dust or oil on exposed end of spark plug porcelain.
4. Loss of compression in any cylinder.
   To locate cylinder that is weak on compression the engine should be turned over by hand and each cylinder tested in turn. Valve may be stuck or there may be dirt under it. Tappet clearances should be checked. It is possible to have clearance between the valve and tappet and yet have an imperfect valve seat. This condition would necessitate inspection of the valve seat. (Page 22.)

5. Water in fuel.
6. Overheating.
7. Carburetor adjustment should be checked.

Loss of Power

The engine will run, but will not pull the car under a heavy load. May be due to:

Too rich mixture.
Valves not seating.
Less than normal tappet clearance.
Ignition improperly timed.
Lack of oil or water.
Lack of fuel, due to obstruction in fuel pipe or carburetor.
Screen filled with dirt.
Dragging brakes.
Engine overheating.
Loss of compression.

Lack of Compression

Faulty cylinder head gasket.
Insufficient tappet clearance.
Valves or rings not seating.
One or more improperly fitted pistons or piston rings.

Popping Back Through Carburetor

This usually indicates too lean a mixture, but may be caused by:

Dirt in carburetor.
Inlet valves holding open.
Water in the fuel.
Air leak at intake manifold connections.
Incorrect ignition timing or limited spark advance.
Secondary wires connected to the incorrect plugs.
Improper kind or defective spark plugs.

Engine Overheats

Lack of proper lubrication.
Stoppage of water circulation or lack of water.
Slipping fan belt.
Imperfect gas mixture.
Ignition timed late or driving with retarded spark.
Limited spark advance.

Engine Knocks

Connecting rod bearing loose.
Crankshaft bearing loose.
Faulty engine lubrication or diluted oil.
Loose piston.
Broken piston ring.
Carbon in cylinders.
Overheating.
Incorrect ignition timing.

Operation

Preparation for Use

When a new car or a car which has been in storage for some time is being prepared for use the fuel tank, radiator and crankcase should be filled with the proper liquids. All parts of the car should be lubricated as indicated on chart on the inside back cover of this book. The air pressure in the tires should be checked to make certain that it is correct. The specific gravity of the liquid in the storage battery should be tested to see that it is properly charged and at the proper level.

To Start Engine

The ignition switch key should be turned. The spark control lever (the left, above the steering wheel) should then be set in the top or full advance position. Except when cranking by hand, the spark lever should be set full advance. The throttle lever (the right, above the steering wheel) should be moved down just far enough to cause the accelerator pedal to go down approximately quarter way. The clutch should be disengaged by pressing the left foot pedal down to the floor board. Then the starting motor pedal should be pressed and the engine turned three or four revolutions. If the engine fails to start on its own power a pause of a few seconds should be made and then the starting motor pedal pressed again for a few moments. Better starting, especially in cold weather, can be secured by interrupted cranking as outlined above than by continuous cranking and there is less possibility of discharging the storage battery.

If the engine fails to start after being cranked several times in the manner described above the cranking should be discontinued until the cause of the difficulty is determined. (Page 67.) If the engine is being started by use of the hand crank the spark lever should be moved to the full retard position (down as far as possible).

As soon as the engine starts to run under its own power, pressure should be released on starting switch button and clutch pedal. The throttle should be closed immediately and the spark lever fully advanced if engine has been cranked by hand. (Both levers should be toward the top of the steering wheel.)

CAUTION: The garage doors should always be opened before starting the engine. The exhaust gases from a gasoline engine contain carbon monoxide, a colorless and odorless gas, which attacks without warning and is generally fatal to those inhaling it. For this reason garage doors should be open while the engine is running.

Driving the Car

The hand brake lever should be in the released position (forward as far as possible) and the clutch disengaged (pedal pressed down to the floor). Then the transmission gears should be shifted to the low speed position by tilting the gear-shifting lever to the left and rearward (or reverse position by tilting the gear-shifting lever to the left and forward, as is required) and the speed of the engine increased slightly by pressure on the accelerator pedal. Simultaneously with the increase of the engine

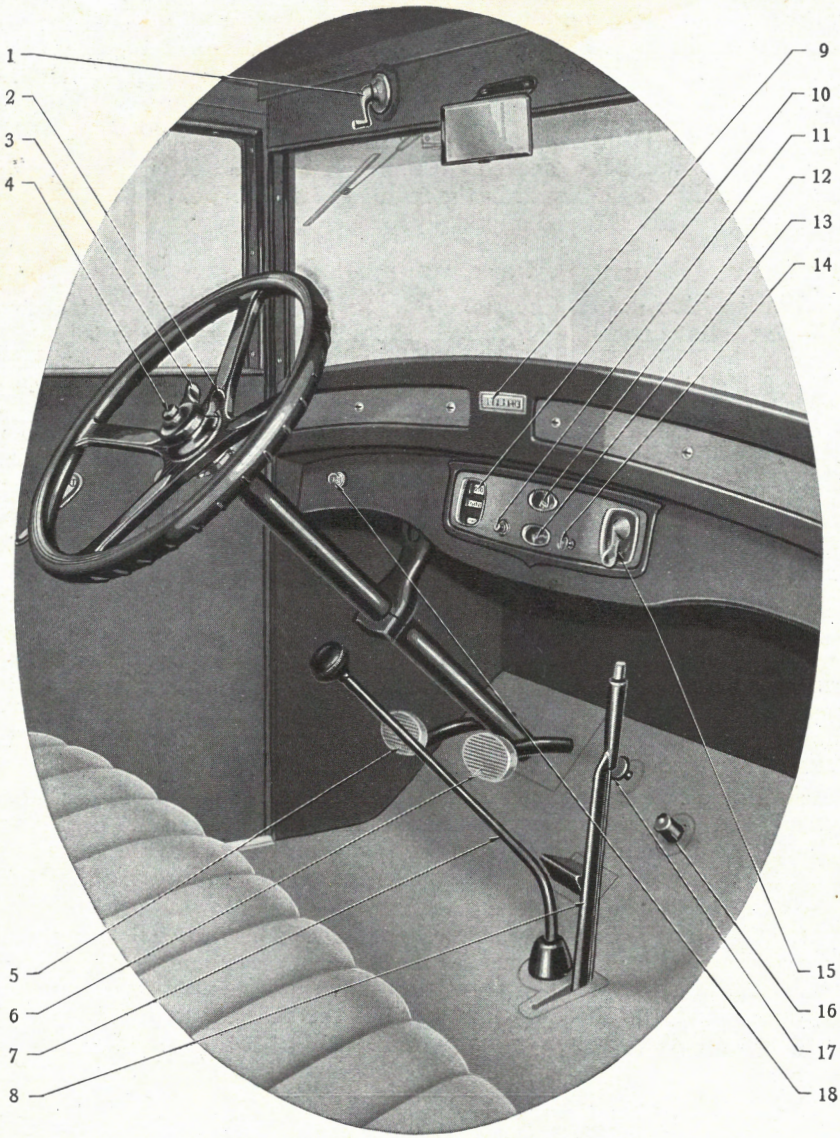


Fig. 28—Front Compartment

speed, the clutch should be gradually engaged. If the car is being moved forward, and when it has attained a speed of about ten miles per hour, the clutch should be disengaged, the accelerator released, and the gears shifted to the second speed position by moving the gear-shifting lever forward to neutral and tilting to the right, then forward again. As soon as the second speed gears are engaged, the clutch should be engaged again and the accelerator pressed until the car reaches a speed of about fifteen to twenty miles per hour. Then the transmission gears should be shifted to the high or third speed position by moving the gear-shifting lever straight back past the neutral position and operating the clutch and accelerator pedals as before.

The transmission gears should never be shifted while the clutch is engaged. The reverse gears should never be engaged while the car is moving forward nor the forward speed gears engaged while the car is moving backward.

If it is necessary to shift the gears from high to a lower speed while the car is moving, the clutch should be disengaged, the desired gears meshed, and the engine speed increased before engaging the clutch. This shift when necessary, due to conditions of traffic or load, should be done quickly so as to retain as much as possible of the momentum of the car. If the driver wishes to drive at a constant speed for any length of time, the throttle may be controlled by the hand lever at the top of the steering wheel (on the right side) and the foot removed from the accelerator pedal.

Stopping the Car

When it is desired to stop the car, the throttle should be closed and the clutch disengaged. The foot brakes should be applied and when the car has stopped the gears should be shifted to the neutral position (central position of gear-shifting lever) and the hand brake applied. The clutch may then be engaged and the engine stopped, if desired, by moving the ignition switch to the vertical or right position. (Fig. 28.)

When leaving the car it is a good precaution for drivers to always lock the ignition and remove the key.

Fig. 28—Front Compartment

1—Windshield regulator
2—Throttle control lever
3—Spark control lever
4—Horn button
5—Clutch pedal
6—Brake pedal
7—Gear shifter lever
8—Emergency brake lever
9—Car serial number plate
10—Speedometer
11—Windshield wiper control valve
12—Ammeter
13—Oil pressure gauge
14—Choke control button
15—Lighting switch lever
16—Starter button
17—Accelerator pedal
18—Ignition switch lock and key

Tools

The following is a complete list of tool equipment furnished with the Chrysler "52". The tools are of first quality and carefully designed so as to take care of all work which an owner may wish to perform on the car:

1 Wheel rim wrench
1 Wheel hub cap wrench
1 Brake cylinder bleeder hose assembly (with hydraulic four-wheel brakes only)
1 Brake cylinder bleeder hose connection (with hydraulic four-wheel brakes only)
1 High-pressure lubricant gun
1 Tire pump
1 Auto jack
1 Auto jack handle
1 Starting crank assembly
1 No. 1 wrench
1 No. 2 wrench
1 Push rod adjusting screw wrench
1 No. 4 wrench
1 Auto wrench (adjustable)
1 Pliers
1 Screwdriver—large
1 Hammer

Accessory Repairs

All questions relative to the repairing or replacing of accessories for the Chrysler "52" should be taken up with their respective manufacturers, a list of whom follows:

Battery

The Willard Storage Battery Co., Cleveland, Ohio.

Carburetor

Carter Carburetor Corp., St. Louis, Missouri.

Ignition Coil, Distributor, Starting Motor and Generator

United Motors Service, Inc., Detroit, Mich.

Horn

Sparks-Withington Co., Jackson, Mich.

Vacuum Tank

Byrne, Kingston & Co., Kokomo, Indiana.

Speedometer

Stewart-Warner Speedometer Corp., Chicago, Ill.

Windshield Wiper

Trico Products Corp., Buffalo, N. Y.

Detailed Specifications

Axle—Rear

Semi-floating, pressed steel housing $\frac{3}{16}$" thick. Drive gear and pinion spiral bevel type, nickel steel carburized and hardened. Drive gear is $8\frac{1}{2}$" in diameter and $1\frac{1}{8}$" wide. Gear ratio 4.3 to 1 on all body types except sedans; 4.7 to 1 on all sedans. Axle shaft: Forging of high alloy chrome-nickel steel, heat-treated, splined into differential side gears, keyed to wheel hub, $1\frac{3}{8}$" diameter at outer bearing end.

Axle—Front

Heat-treated, I section drop forging. Adjustable roller wheel bearings. Yoke bushings: Bronze, $\frac{3}{4}$" inside diameter by $1\frac{3}{32}$" long. Ball thrust bearings at steering knuckle head. Steering knuckles are of chrome-nickel steel forgings. Steering arms are of chrome-nickel steel forgings.

Bodies

Chrysler designed.

Brakes—Service

External contracting on rear wheels. Drums 12" diameter, brake bands 2" wide. Chrysler Lockheed hydraulic, external contracting on wheel drums special equipment, drums 12" diameter, brake bands $1\frac{1}{4}$" wide.

Camshaft

Mounted on 3 bearings, front bearing $1\frac{1}{4}$" diameter, $1\frac{9}{16}$" long, die-cast, babbitt. Center bearing 2" diameter by 1" long. Rear bearing $1\frac{1}{4}$" diameter by $1\frac{3}{8}$" long. Center bearing machined in crankcase. Oil pump and distributor drive gear integral with camshaft.

Carburetor

Plain-tube type with adjustment for idle speed only. Equipped with air cleaner.

Clutch

The clutch is of the single dry plate type. Driven disc $8\frac{7}{8}$" in diameter with asbestos composition fabric facing riveted to it on each side.

Connecting Rods

I-beam section. Drop-forged alloy steel. $7\frac{7}{8}$" between centers. Crankshaft bearing is babbitt cast in rod $1\frac{7}{8}$" diameter by $1\frac{1}{2}$" wide.

Control

Conventional left hand drive, center control. Spark and throttle levers, and horn button at top of steering column.

Cooling System

Water (capacity $3\frac{1}{2}$ gallons), circulated by thermo-siphon system. Vertical tube radiator with detachable shell. Two-blade 17" fan driven by V-belt. Quickly adjustable to take up wear of belt.

Crankshaft

Statically and dynamically balanced. Supported on 3 bronze-backed, babbitt-lined main bearings. Front bearings $1\frac{7}{8}$" in diameter, $2\frac{13}{32}$" long. Center bearing $2\frac{1}{4}$" in diameter, $1\frac{5}{8}$" long. Rear bearing $1\frac{7}{8}$" in diameter, $2\frac{13}{16}$" long. Thrust taken on rear bearing. Crankshaft is drilled to permit oil being forced to connecting rod bearings.

Cylinders

Four, cast en bloc, integral with crankcase, with heavy cross web construction of center main bearing support. Detachable cylinder head. Bore $3\frac{5}{8}$", stroke $4\frac{1}{8}$". Finish reamed and honed.

Drive

Hotchkiss type horizontal drive.

Engine

L-type, water-cooled, four cylinders, four-cycle. Bore $3\frac{5}{8}$", stroke $4\frac{1}{8}$", S. A. E. horsepower 21.03, developed horsepower 45, piston displacement 170.3 cubic inches. Suspension: rear, steel brackets riveted to frame and bolted to arms on flywheel housing; front, semi-elliptic steel spring bolted to gear case cover, ends of spring rest on frame cross member. Unit type. Firing order 1-3-4-2. Force feed lubrication to all crankshaft, center camshaft, and connecting rod bearings. Spray from small hole in connecting rod bearings lubricates cylinders and camshaft end bearings. Three-bearing crankshaft. Three-bearing camshaft.

Electrical System

Single wire system. Generator—third brush regulation, six-volt type. Starting Motor—Six-volt type with Bendix drive. Battery—Six volts, ninety ampere hour capacity.

Fenders and Running Board

Fenders—Heavy sheet steel, baked enamel finish, assembled to car with fabric packing strips. Wood running board, linoleum-covered.

Flywheel

Gray iron, dynamically and statically balanced. Starter gear teeth cut in flywheel.

Frame

Pressed steel, wide flange. Channel 5" deep. Length $150\frac{1}{4}$". Thickness $\frac{9}{64}$". Flanges $1\frac{3}{4}$" wide at center section, tapering to $2\frac{19}{32}$" at front cross member and $2\frac{13}{16}$" at rear of body. Three cross members.

Fuel System

Vacuum tank supply system, eleven-gallon fuel tank mounted at rear of frame. Fuel supply tank of rust-proof, Terne plate.

Horn

Electric motor-driven type with adjustable diaphragm for tone. Located under hood. Button on top of steering column.

Ignition

Top outlet waterproof distributor and coil. Semi-automatic advance. Six-volt battery ignition.

Lamps

Bullet type headlamps, combination tail and signal, and instrument panel lamp (dome lamp on Sedan).

Lubrication—Engine

High-pressure to all crankshaft and connecting rod bearings and center camshaft bearing. Pump located on right side of crankcase, driven by spiral gear on camshaft. All other working parts lubricated by positive spray under pressure from hole in connecting rods, also from crankshaft and camshaft. Timing gears lubricated by direct oil lead from front crankshaft bearing. Oil capacity 1 gallon. Pressure gauge on dash. Level indicator on left side of crankcase beside filler.

Overall Length

153 inches.

Pistons

Light alloy, ventilated bridge type. Length $4\frac{1}{8}$". Fitting clearance .001" to .0015" at bottom of skirt, .003" to .0035" at top of skirt. Lower ring groove drilled with twelve $\frac{3}{32}$" oil return holes.

Piston Rings

Gray iron, 3 per piston, concentric. Width $\frac{1}{8}$". Center ring undercut. Special oil-control ring in lower groove.

Piston Pins

Alloy steel, case-hardened and ground ¾" in diameter by 3" long, clamped in rod.

Propeller Shaft

Seamless steel tubing, forged ends electrically welded; diameter 1½".

Spark Plugs

⅞" No. 18 S. A. E. thread, heavy electrodes.

Springs

Semi-elliptic. Front: Length 35½", width 1¾", 9 leaves. Rear: Length 53½", width 1¾". Coupe and Roadster 7 leaves, Touring 8 leaves, Four-door Sedan and Two-door Sedan 9 leaves.

Steering Gear

Semi-irreversible, worm and sector type. Adjustable for wear. Steering arm drop-forging, heat-treated.

Timing Gears

Crankshaft gear, steel; camshaft gear, fabric composition; helical teeth, lubricated by stream of oil from front crankshaft bearing oil passage.

Tires

Cord, non-skid tread on all wheels. Size 29 x 4.75. Balloon cords on all models.

Transmission

Three-speed, selective sliding gear type. Unit with engine. Main shaft mounted on ball bearing at rear end and bronze bearing at front end in main drive gear. Main drive gear mounted on ball bearing in rear and bronze pilot bearing in crankshaft. Countershaft, bronze bearings. All gears are chrome steel.

Gear Ratio:	Propeller Shaft	Final Drive All body types except Sedans	Final Drive All Sedans
High	1 to 1	4.3 to 1	4.7 to 1
Intermediate	1.9 to 1	8.17 to 1	8.93 to 1
Low	3.06 to 1	13.15 to 1	14.38 to 1
Reverse	3.76 to 1	14.16 to 1	17.67 to 1

Tread

56 inches.

Universal Joints

Two used, flexible rubberized discs bolted to forged ends on propeller shaft.

Valve Tappets

Mushroom type chilled cast iron head welded to hollow steel stem. Mounted in cylinder block. Tappet clearance: Exhaust .006, intake .004.

Valves

Inlet, chrome-nickel steel. Exhaust, silchrome steel. Location: Right side, enclosed. Clear diameter of opening $1\frac{9}{16}$", stem ⅜", 45-degree seat. Lift $\frac{9}{32}$". Valve stem guides removable.

Wheels

Wood, artillery type. Demountable rims.

Windshield Wiper

Automatically operated by engine suction with control valve on instrument panel.

ORDERING PARTS

Chrysler owners are kindly requested to purchase parts from Chrysler Service Stations where adequate stocks of "Genuine Chrysler Parts" are carried. Should a dealer not have a desired part on hand, it can be quickly obtained from the Chrysler Parts Department.

The car serial number, on plate built into instrument panel, should be mentioned in any orders or correspondence regarding the car to assist the dealer's service department to promptly and intelligently fill the orders or answer the correspondence. Chassis shipped without bodies have serial number plate built into frame right side member vertical section just forward of the rear end of the hood.

Parts of accessories to the car not manufactured by the Chrysler Sales Corporation should be ordered from the respective manufacturers or service stations. (See list, Page 73.) Chrysler Service Stations will assist in this service.

RETURNING PARTS

Chrysler Service Stations have been supplied with special forms and tags that greatly expedite the handling of parts returned to the factory for inspection and credit consideration. Owners are kindly requested to make all parts returns through Chrysler Service Stations.

Parts of accessories to the car not manufactured by the Chrysler Sales Corporation should be sent to the respective manufacturers or service stations. (See list, Page 73.) Chrysler Service Stations will gladly perform this service for Chrysler owners.

Any part sent to the Company with a request for free replacement is to be returned through a Chrysler Distributor or Chrysler Service Station for factory credit consideration. No charge is permissible to the owner by the Distributor or any Chrysler Service Station for handling the claim or the material.

GENUINE PARTS

If, for any reason, Chrysler parts are required, Chrysler owners should be sure to insist on *genuine* parts from the Chrysler Sales Corporation. It is a matter of great importance to do this. If it is ever necessary to have a Chrysler car repaired at any except an authorized Chrysler Service Station, owners should insist upon the following notation being placed on the invoice rendered for the repair work:

"Genuine Chrysler Parts Used in Making These Repairs"

Parts from the Chrysler Sales Corporation are of standard production quality, engineered, manufactured and *inspected* to afford in every respect the same high standard of quality as required in the building of Chrysler cars.

Chrysler *genuine* parts are priced in reasonable ratio to their costs, considering the quality and care exercised in their manufacture, as contrasted with non-genuine parts which are made and sold solely for profit.

Only the Chrysler Sales Corporation could have the unfailing insistence that its parts should invariably be of the best quality.

Genuine Chrysler parts carry the same warranty as Chrysler cars. If a new part proves defective within ninety days, another will be furnished gratis.

INSIST ON
GENUINE CHRYSLER PARTS

Warranty

(Standard Warranty of the National Automobile Chamber of Commerce)

"We warrant each new motor vehicle manufactured by us, whether passenger car or commercial vehicle, to be free from defects in material or workmanship under normal use and service, our obligation under this warranty being limited to making good at our factory any parts or part thereof which shall within ninety (90) days after delivery of such vehicle to the original purchaser be returned to us with transportation charges prepaid, and which our examination shall disclose to our satisfaction to have been thus defective; this warranty being expressly in lieu of all other warranties, expressed or implied, and of all other obligations or liabilities on our part, and we neither assume nor authorize any other person to assume for us any other liability in connection with the sale of our vehicles.

"This warranty will not apply to any vehicle which shall have been repaired or altered outside of our factory in any way so as, in our judgment, to affect its stability or reliability, nor which has been subject to misuse, negligence or accident, nor to any commercial vehicle made by us which shall have been operated at a speed exceeding the factory rated speed, or loaded beyond the factory rated load capacity.

"We make no warranty whatsoever in regard to tires, rims, ignition apparatus, horns or other signaling devices, starting devices, generators, batteries, speedometers or other trade accessories, inasmuch as they are usually warranted separately by their respective manufacturers."

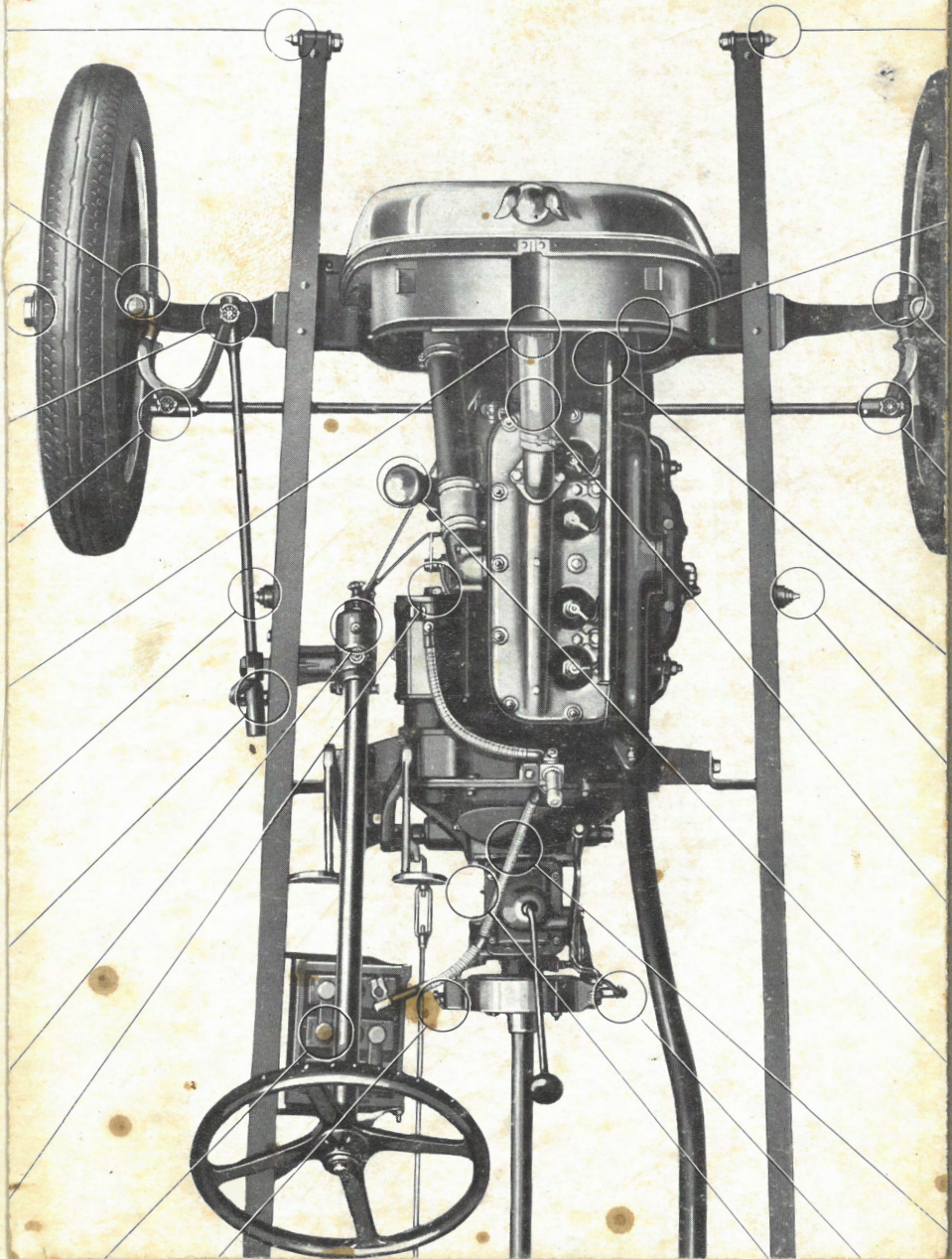
CHRYSLER SALES CORPORATION
Detroit, Michigan

The Chrysler Sales Corporation reserves the right to make changes in design or to make additions to or improvements in its product without imposing any obligation upon itself to install them on its product previously manufactured.

SPEAKER-HINES PRINTING CO.
DETROIT

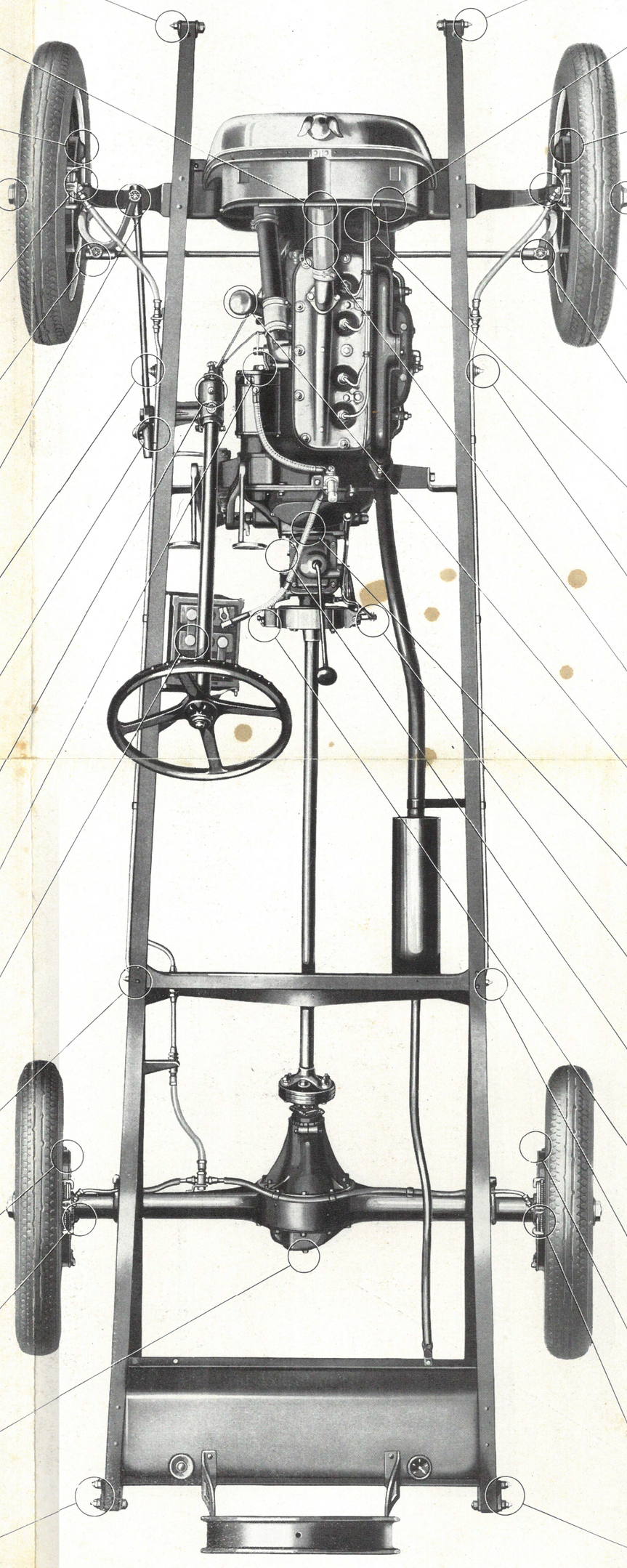
Lubrication Chart

Chrysler "52"—Two-Wheel Brak



Lubrication Chart

Chrysler "52"—Four-Wheel Brakes



Red

Lubricate every 500 miles

- Spring Bolt — Fluid Gear Lubricant
- Generator — Engine Oil
- Brake Anchor — Engine Oil
- Front Wheel Bearings — Medium Cup Grease
- Steering Spindle — Fluid Gear Lubricant
- Tie Rod Ball Joint — Fluid Gear Lubricant
- Drag Link Ball Joint — Fluid Gear Lubricant
- Spring Bolts — Fluid Gear Lubricant
- Drag Link Ball Joint — Fluid Gear Lubricant
- Steering Gear — Special Heavy Steering Gear Lubricant If Necessary, in Extremely Low Temperatures, Dilute with Engine Oil
- Starting Motor — Engine Oil — Every other time
- Battery—Distilled Water — ½" Above Plates
- Spring Bolt — Fluid Gear Lubricant
- Brake Anchor — Engine Oil
- Rear Axle Shaft (Wheel) Bearing — Fluid Gear Lubricant
- Rear Axle—Fluid Gear Lubricant For Winter Dilute with One-half Pint of Colorless Kerosene
- Spring Bolts — Fluid Gear Lubricant

Green

Lubricate every 2000 miles

- Spring Bolt — Fluid Gear Lubricant
- Distributor Base — Oil Cup — Engine Oil
- Brake Anchor — Engine Oil
- Front Wheel Bearings — Medium Cup Grease
- Steering Spindle — Fluid Gear Lubricant
- Tie Rod Ball Joint — Fluid Gear Lubricant
- Distributor—Grease Cup — Refill with Medium Cup Grease
- Spring Bolts — Fluid Gear Lubricant
- Generator — Engine Oil
- Engine
  - Medium or Heavy Body Engine Oil (S. A. E. Viscosity No. 30) —Summer — Change Every ~~1000~~ 750 Miles
  - Medium Body Engine Oil (S. A. E. Viscosity No. 20 or 30) Low Cold Test—Winter — Change Every 500 Miles
- Clutch Release Bearing — Fluid Gear Lubricant
- Brake Lever Connections — Engine Oil
- Transmission — Fluid Gear Lubricant — For Winter Dilute with One-quarter Pint of Colorless Kerosene
- Brake Anchor — Engine Oil
- Spring Bolt — Fluid Gear Lubricant
- Brake Anchor — Engine Oil
- Rear Axle Shaft (Wheel) Bearing — Fluid Gear Lubricant
- Spring Bolts — Fluid Gear Lubricant

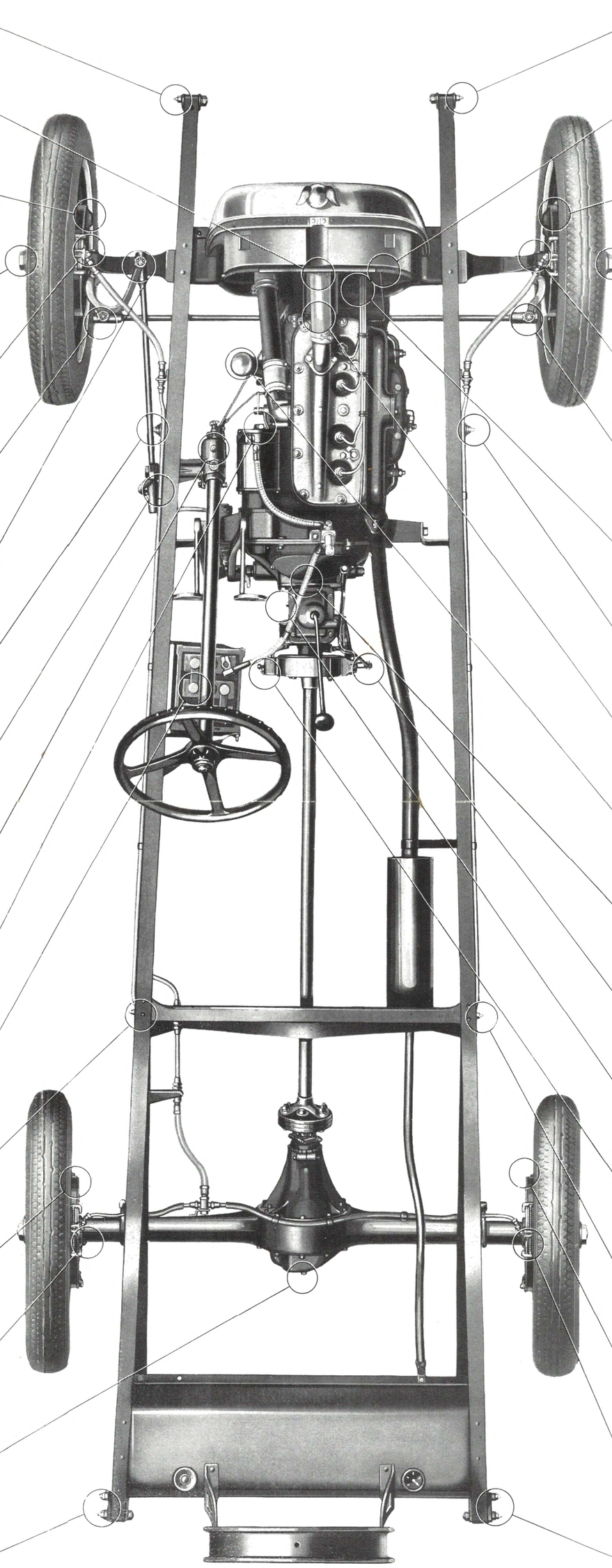
Black

Lubricate every 5000 miles unless otherwise specified

PRINTED IN U. S. A.
FEBRUARY, 1928

Lubrication Chart

Chrysler "52"—Four-Wheel Brakes



Spring Bolt
Fluid Gear Lubricant

Generator
Engine Oil

Brake Anchor
Engine Oil

Front Wheel Bearings
Medium Cup Grease

Steering Spindle
Fluid Gear Lubricant

Tie Rod Ball Joint
Fluid Gear Lubricant

Drag Link Ball Joint
Fluid Gear Lubricant

Spring Bolts
Fluid Gear Lubricant

Drag Link Ball Joint
Fluid Gear Lubricant

Steering Gear
Special Heavy Steering Gear Lubricant
If Necessary, in Extremely Low Temperatures, Dilute with Engine Oil

Starting Motor
Engine Oil
Every other time

Battery—Distilled Water
½" Above Plates

Spring Bolt
Fluid Gear Lubricant

Brake Anchor
Engine Oil

Rear Axle Shaft (Wheel) Bearing
Fluid Gear Lubricant

Rear Axle—Fluid Gear Lubricant
For Winter Dilute with One-half Pint of Colorless Kerosene

Spring Bolts
Fluid Gear Lubricant

Spring Bolt
Fluid Gear Lubricant

Distributor Base
Oil Cup
Engine Oil

Brake Anchor
Engine Oil

Front Wheel Bearings
Medium Cup Grease

Steering Spindle
Fluid Gear Lubricant

Tie Rod Ball Joint
Fluid Gear Lubricant

Distributor—Grease Cup
Refill with Medium Cup Grease

Spring Bolts
Fluid Gear Lubricant

Generator
Engine Oil

Engine
- Medium or Heavy Body Engine Oil (S. A. E. Viscosity No. 30) —Summer
  Change Every ~~1000~~ 750 Miles
- Medium Body Engine Oil (S. A. E. Viscosity No. 20 or 30) Low Cold Test—Winter
  Change Every 500 Miles

Clutch Release Bearing
Fluid Gear Lubricant

Brake Lever Connections
Engine Oil

Transmission
Fluid Gear Lubricant
For Winter Dilute with One-quarter Pint of Colorless Kerosene

Brake Anchor
Engine Oil

Spring Bolt
Fluid Gear Lubricant

Brake Anchor
Engine Oil

Rear Axle Shaft (Wheel) Bearing
Fluid Gear Lubricant

Spring Bolts
Fluid Gear Lubricant

Red

Lubricate every 500 miles

Green

Lubricate every 2000 miles

Black

Lubricate every 5000 miles unless otherwise specified

PRINTED IN U. S. A.
FEBRUARY, 1928